

1873

Field Notes



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**THE FAMILY HERALD AND WEEKLY STAR,
MONTREAL.**

FLOWERS

OF THE

FIELD AND FOREST.

BY C. M. D.

REPRINT OF A SERIES OF ARTICLES WHICH APPEARED
IN THE FAMILY HERALD AND WEEKLY STAR
DURING THE SUMMER OF 1900.

PRICE TEN CENTS.

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1901

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P R E F A C E.

 THIS little book is a collection in handy form of a series of articles that appeared in the columns of the Family Herald and Weekly Star during 1900.

These articles are from the pen of a well known botanist of high standing and are accurate and trustworthy in every detail. The drawings and descriptions of the various flowers are in most cases from actual specimens, and where these were lacking the works of recognized authorities have been referred to. The articles constitute a calendar of plant life from early spring to late autumn, and the numerous illustrations and detailed descriptions will enable any one to identify a large number of the flowers commonly met with in a ramble through the fields. The articles are written in pleasing style and an endeavour is made to set forth some of the more striking scientific truths in connection with plant life in such a way as to be understood by all. Botany is not the dry uninteresting science that many imagine, it does not consist merely of naming, classifying, and comparing a collection of plants; the essential problem is to understand the life of the plant, to comprehend its functions, to inquire what is the use to the plant of its root, stem, leaves, its flower and fruit. This thought has been kept in view by the writer of articles in this book and if those who happen across it should be led to a better understanding of some of the problems of nature it will not have been published in vain.

The illustrations in this book which are not original have been reproduced or adapted from the following works: Britton and Brown's "Illustrated Flora of the Northern States and Canada;" Atkinson's "Elementary Botany;" Couiter's "Plant Relations," Gibson's "Sharp Eyes," and "My Studio Neighbours;" Mrs. Dana's "How to Know the Wild Flowers;" Blanchan's "Nature's Garden;" and Gray's "Structural Botany."

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Flowers of the Field and Forest.

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I.

INTRODUCTION.

Spring begins, says Burroughs, "when the partridge drums; when the hyla peeps; when the shad start up the rivers, and the grass greens in the spring runs; and it ends when the leaves are unfolding and the last snow-flake dissolves in mid-air." Like Easter, therefore, spring is a movable feast, not to be welcomed at any fixed date. No almanac, however, is needed to tell us that the breath of spring is in the air. Even before the catkins unfold and the buds swell, the spirit of growth calls to us to come forth and witness nature's yearly miracle. Then, if ever, we are filled with a longing to know the world which lies around us, and in our walks every wood and meadow proves to be an undiscovered country, full of treasures for the traveller who has a seeing eye and a hearing ear. But notwithstanding an almost universal hunger for a knowledge of the world that lies around us, the majority are as blind men who say there is no such thing as sight. A hint, however, often leads to the discovery of new beauties in every day objects

"We are made so, that we love
First, when we see them painted, things
we have passed
Perhaps a hundred times, nor cared to see."

So, with but little study, we may find hidden in a flower all the mystery of life and of death. To us, it is no longer merely a pretty specimen; it lives and breathes and moves; it has its loves and hates, its friends and its foes; it struggles for its existence, and adapts itself to circumstances; it flourishes in congenial surroundings, but languishes and dies in any place foreign to its nature. To know a plant implies meeting it in its home, studying its peculiarities, learning its family history, recognizing its relations, and becoming familiar with its visitors. Does this seem to demand too much of busy workers? It will be found that even he who runs may read a few pages in Nature's book. Material for thought and study lies close at hand, and all who look may find

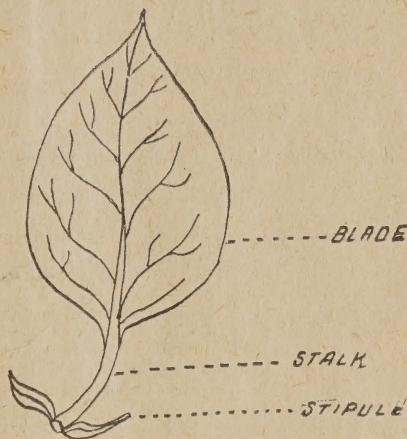


FIG. 1—A TYPICAL LEAF.

"Tongues in trees, books in the running
brooks,
Sermons in stones, and good in every-
thing."

Love for our floral neighbours implies not only a desire to know them, but a wish to call them by name. When told that more than 3500 flowering plants have been found growing wild in Canada, we may despair of having even a passing acquaintance with the flowers of our own country. But we must begin to make our circle of friends at home, gaining there an understanding and sympathy which will give us an insight into the nature of all. Plants fortunately occur in families and show such strong family resemblances that it soon becomes easy to recognize each new found stranger as a relative of some old friend. Notwithstanding great differences, flowering plants adhere to certain plans which may be readily learned. Let us then as a preparation for talks about common Canadian wild flowers, briefly consider the parts of a typical flowering plant, perfect and complete.

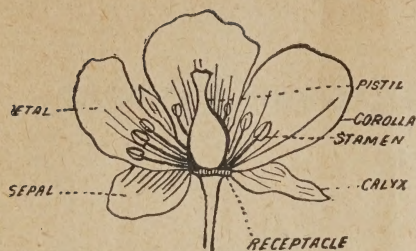


FIG. II.—A TYPICAL FLOWER.

Taking up first those organs which are concerned with the nutrition of the plant, we observe that there is a root which serves to anchor the plant in the soil and which sends out thread-like branches in every direction searching for food. Such a root, for example that of corn, is said to be fibrous. Other plants, like the beet, have thick fleshy roots, in which food is stored for future use.

Rising above the ground is the stem. In small plants, it is usually green and dies down to the ground every winter; but large brown stems, such as the trunks of trees may live on from year to year. As the function of the stem is to lift the leaves into the light and air, it is generally erect and frequently branches. Sometimes, however, a stem too weak to stand alone, climbs or twines upon a support. Morning glories and peas are familiar examples.

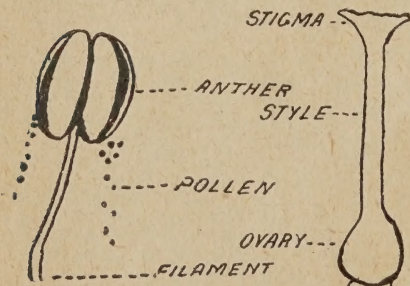


FIG. III — TYPICAL STAMEN AND PISTIL.

Other stems, like that of the white clover, creep along the surface of the earth. Potatoes and many other plants have thick, fleshy, underground stems, serving as store-

houses for food. They can always be distinguished from fleshy roots by the presence in the former of scale-like leaves and of buds.

Exposed to sunlight and air, are the leaves scattered as a rule along the stem at different intervals. Each leaf has usually a stalk and a flat, thin, green portion called the blade. Frequently at the base of the stalk are leaf-like expansions known as stipules (Fig. 1.) Both stalk and stipules may, however, be wanting. Leaves vary in shape from the needles of the pine to the round disc of the *Tropaeolum*, wrongly called *Nasturtium*. Some have entire margins, while others have their edges more or less deeply notched. However deep the cuts, if the divisions do not extend to the central line, the leaf is considered simple, but if, as in the rose, it is broken up into distinct parts it is said to be compound.

The green material of which the leaf is largely composed, is supported by a framework of veins; one larger than the rest generally runs down the centre of the leaf and is known as the midrib. If the veins branch and unite with one another, the leaves are net-veined; but if the veins run side by side without branching, the leaves are parallel-veined. The differences between leaves are chiefly those of form, all serving similar purposes. In them plant food is prepared and digested, and by means of them plants breathe and transpire, that is, give off superfluous moisture.

While root, stem, and leaves are devoted to the nourishment of the plant, other portions are set aside for the production of seed. These parts are arranged in circles upon the enlarged end of a stem called a receptacle and together they compose the flower (Fig. II.) On the outside, enclosing and protecting the other floral organs in the bud, is the calyx, made up of several green leaf-like bodies called sepals. The sepals may be either separate or united so as to form a sort of cup. Within the calyx is the corolla, the conspicuous, coloured portion of the flower. It is composed of petals, which varying marvellously in shape, colour and markings, may be quite distinct or joined together.

Next comes one or more whorls of slender stamens; each of which has a thread-like stalk called a filament, and at the top an anther, composed of two halves or lobes filled with pollen, a yellow dust. By the splitting of the lobes the pollen is set free. (Fig. III. 2.) As may be seen from an examination of Fig. IV., the forms of stamens and their ways of opening are many and interesting.

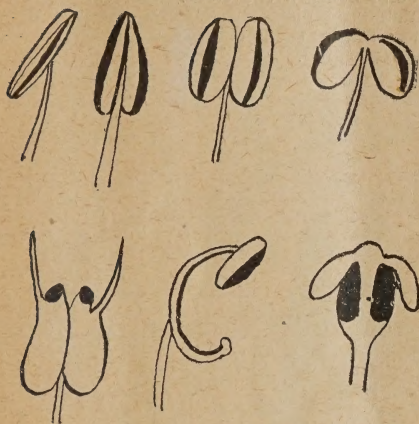


FIG. IV.—A GROUP OF STAMENS.

At the heart of the flower stands the seed-case or pistil. It is composed of three distinct parts—a hollow basal portion called the ovary, in which seeds are produced; a slender style or stalk arising from the top of the ovary; and a sticky expansion crowning the style and known as the stigma. When a pistil has only one chamber in the ovary, one style, and one stigma, it is said to be composed of one carpel. It may, however, be made up of several carpels quite separate, or more or less united. The number of the component carpels is indicated by the number of divisions in the ovary or by the number of stigmas.

In order that good seed may be formed in the pistil, pollen must be conveyed from an anther to the stigma; and in most cases pollen from the same flower is less effective than that from another plant of the same kind. Cross-pollination, that is the transference of pollen from one plant to another, must be performed by some outside agency. Plants have, therefore, acquired bright colours, quaint forms and sweet odours, as means of attracting insects, which seeking honey in flower after flower carry pollen on various parts of their bodies from plant to plant.

Having thus learned a few essentials about all ordinary flowering plants, we are prepared, in rambles "on the hill-slopes, by the brook-side, in woodland ways," to gain a fuller understanding of the wonders and beauties of our native flowers.

II.

SPRING WOODS.

"Look thou not down 'but up'" might well be taken as the motto of flower-lovers in spring, for the trees bear this season's earliest greetings. From the woods, fresh breezes waft a strange faint perfume which is "to the sense of smell what a mild and de-



FIG. V.—PUSSY WILLOW.

licate strain of music is to the ear." Brown buds having thickened on the trees now are unfolding flowers and leaves so snugly tucked away during a long winter's sleep. Curiously enough the blossoms of the largest trees are very small and often so inconspicuous that the world passes by heedless of these dainty hints of coming glories.

Long before the snow has disappeared, the "pussies" on the willows burst their purplish-brown winter jackets and in velvety gray form a charming contrast to the reddish twigs which bear them. From Nova Scotia to the North-West Territories, pussy willows, *Salix discolor*, abound in swamp and bog, and find congenial homes on every damp hillside. Coaxed by warm spring sunshine, the pussies quickly grow into catkins an inch or more long. Certain trees bear golden yellow, fuzzy catkins, which seem to be a mass of stamens (Fig. V., 1). If a catkin is broken up it will prove to be a cluster of very simple flowers, each of which, being destitute of calyx, corolla and pistil, consists of two slender stamens standing in front of a little hairy leaf called a bract. (Fig. V., 2). These bracts overlapping one another in the bud protected the young flowers from

cold and gave the "pussies" their characteristic fluffy appearance. The trees having these staminate flowers can, of course, never bear seed. In the neighbourhood, however, will be found other pussy willows whose silvery green catkins (Fig V., 3) are apparently made up of a great number of



FIG. VI.—POPLAR AND HEART-LEAVED WILLOW LEAVES.

club-shaped pistils. But like the staminate catkins they are clusters of simple imperfect flowers. Only, in this case, the flowers lack calyx, corolla, and stamens, and each is composed of a single pistil fastened at its base to a hairy bract. (Fig. V., 4). Though there is no corolla, the large catkins are conspicuous enough to attract insects, and the honey-bee, flying eagerly from tree to tree, secures a spring feast of honey and pollen and in its flight carries the golden dust to waiting stigmas. Their work over, the staminate catkins fall, but the pistillate flower-clusters remain after the leaves have unfolded, and until their seed is ripened and ready to float away on the silky sails attached to the seed-coats.

The forty-seven kinds of Canadian willows resemble one another closely in their flowers which appear before the leaves. Probably the most widely spread of all is the heart-leaved willow, *Salix cordata*, which has innumerable forms scattered over the Dominion from the Atlantic to the Pacific. All these differ from the pussy willow in having leaves with a heart-shaped base. (Fig. VI., 1). Belonging to the willow family are the poplars (Fig. VI., 2), covered with gray downy tassels before a trace of green leaf is to be seen. The staminate clusters like long caterpillars soon thickly strew the

ground beneath the trees. But those trees which bear pistillate flowers, like the willows, retain their catkins until the seeds have matured.



FIG. VII.—GREEN ALDER.

From Labrador to British Columbia, the green alder, *Alnus alnobetula*, drooping over mountain stream expands its purple and gold catkins about the same time as its leaves. From it, too, bees fly away with pellets of golden pollen, but the journey from stamen to pistil is short, for although in separate flower-clusters they grow on the same shrub. The long drooping catkins (Fig. VII., 1) are made up of scale-like bracts, to each of which is attached from three to six flowers, every flower having a small four-lobed calyx and four stamens. Close by are upright bodies resembling miniature pine-cones (Fig. VII., 2). Pulling one of these apart, it will be seen that each scale bears from two to three pistillate flowers destitute of calyx, corolla, and stamens. Each pistil finally ripens into a little nut with broad wings upon which it floats away at maturity (Fig. VII., 4). Belonging to the same family are the birches, which also bear catkins of staminate and little clusters of pistillate flowers on the same tree. The birch catkins are, however, especially beautiful. When full-grown they are extremely long and graceful, of a silky softness and with a rich golden colour.

Even in April, the swamp or red maple, *Acer rubrum*, "crimsons to a coral reef." Before a leaf appears, every twig is covered with exquisite clusters of tiny red blossoms, which sometimes fall before the snow has



FIG. VIII.—SUGAR MAPLE.

vanished, showing up most brilliantly against dazzling white drifts. Very similar are the flowers of the silver maple, *Acer dasycarpum*, a much rarer tree in the east. The colour of its flowers is much yellower and less brilliant than that of the red maple blossoms. In both it is difficult on account of the small size of the flowers to distinguish their parts. This may be more easily done in those of the sugar maple, *Acer saccharum*, the blossoms of which appear a little later than the leaves (Fig. VIII., 1). The greenish-yellow flowers are borne on slender, hairy stalks, in graceful, drooping clusters. The blossoms are of three kinds, all growing on the same tree. One has no pistils (Fig. VIII., 4), another no stamens (Fig. VIII., 3), while a third possesses both (Fig. VIII., 2). Each has a cup-shaped calyx divided into five teeth representing five sepals. Neither the sugar nor silver maple flower has a corolla, but in the red maple blossom five small, narrow petals are present. The pistil is divided into two one-seeded parts, from each of which develops later a wing-like float. So the maple keys which in the summer will lie scattered over country roads and city streets, are really the fruits of the tree (Fig. VIII., 5).

Another early blooming tree is the basswood or American linden, *Tilia americana*. This fine tree with heart-shaped leaves is found throughout Eastern Canada from New Brunswick to Lake Winnipeg. Dur-

ing the first weeks of May its clusters of fragrant, honey-bearing flowers appear hanging from the centre of a narrow leaf-like bract (Fig. IX., 1). Each flower has five



FIG. IX.—BASSWOOD OR LINDEN.

sepals, five cream-coloured petals and many stamens arranged in five clusters. (Fig. IX., 2.) Each pistil develops into a round, hard, woody, one-seeded fruit attached to the bract which acts as a float when the fruit falls in the late summer (Fig. IX., 3). The flowers with their strong scent and pretty colour, attract myriads of insects which eagerly sip the honey secreted by the sepals.

One of the most charming of our Canadian trees, lending grace to the landscape from Nova Scotia to the North-West Territories, is the elm, *Ulmus americana*. Before the leaves supply a light mantle of green, the flowers on slender drooping stalks fringe the sides of every branch. (Fig. X., 2.) Each blossom is furnished with a yellowish or reddish calyx, bell-shaped, and from four to nine-toothed. The stamens, from four to nine in number, have very long, slender filaments (Fig. X., 4), and the pistil with its two stigmas grows into a one-seeded fruit almost encircled by a thin wing or float. (Fig. X., 3.)

The oak is so generally regarded as an English tree that it may be surprising to learn that there are eleven species of oak growing wild in Canada. Of these, the mossy cup oak, *Quercus macrocarpa*, is most widely distributed over New Bruns-

wick, Quebec, Ontario and Manitoba, but it never occurs in such great quantities nor does it grow so large as some of the other species. Mixed with white pine and frequenting sandy plains throughout the west



FIG. X.—ELM.

It is impossible in one short paper to give even a brief description of the native trees. But, perhaps enough has been said to persuade all that the secrets of opening buds are well-worth finding out.



FIG. XI.—RED OAK.

of the province of Quebec, and the east and north of Ontario, is the white oak, *Quercus alba*. The best known form is, however, the red or black oak, *Quercus rubra*, of Nova Scotia, Quebec and Ontario. Its flowers are greenish or yellowish and of two kinds. When the leaves are expanding in the spring the delicate slender catkins of staminate flowers are exquisite objects (Fig XI., 1). Petals are wanting but each staminate flower has a small cup-shaped calyx with several deep lobes. The stamens, variable in number, reach just below the margin of the flower. (Fig. XI., 3.) The pistillate flowers stand erect on short stalks either singly or a few in a cluster (Fig. XI., 2). Each has a very small urn-shaped calyx with short lobes, and the pistil possesses a three-chambered ovary and three stigmas. Only one seed grows, and the fruit is an acorn. (Fig XI., 5.) Chestnuts and beeches are own cousins of the oak and bear similar flowers. The small cluster of beech blossoms appears with the leaves, but the drooping cream-coloured catkins of the chestnut come later. This family has its pollen carried to the pistils by the wind, and it may be stated that, as a general rule, when tree blossoms are neither bright nor fragrant enough to attract insects, the flowers are put forth before the leaves fully unfold, and the slender stamens quiver with every breath of wind, which carries the golden pollen to distant stigmas.

Great as is the charm of a wood in mid-summer, still greater is it in the early spring, when "Young oak leaves mist the side-hill woods with pink," when

"The saffron swarms swing off from all the willers,
So plumb they look like yaller caterpillars;
When gray hoss-chestnuts' leetle hands unfold,
Softer'n a baby's be at three days old."

III.

UNDER THE TREES.

The common lot of all living beings is a struggle for existence, and nothing is more interesting than the study of the strife. Our wonder is always excited by the marvelous way in which many plants have suited themselves to various soils, climates, and companions; while others, unable to adapt themselves to their environment, have failed in the struggle or have even disappeared. As was said in a former paper, light is an essential to green plants; it might, there-

fore, be expected that few or no low plants would flourish in the heart of the wood. Some, however, have found a way out of the difficulty and have learned to take advantage of the brief interval during which the trees are bare or clothed with light foliage, choosing the early spring for rapid growth and bloom. So it is to the woodland rather than to meadow or hillside that we go in April and May for the harbingers of spring. Few things seem more miraculous than the rapidity with which purple and green spears piercing the mould unfold into exquisite banners and gleaming stars. Foresight is the secret of the mystery. As soon as seed was ripened last summer, the plants turned their attention to the manufacture of food and stored it in underground stem or root. At the same time, buds were slowly formed in which lay rolled the leaves and flowers of this spring. So, in April, all that remains to be done is the pushing up of buds into the sunlight, where they announce that the snow is over and gone, "the flowers appear on the earth, the time of the singing of birds is come."

Many are the disputes as to which flower is the first promise of spring. There is little doubt, however, that the unpoetic skunk-cabbage, *Symplocarpus foetidus*, can claim

the honour. Thoreau says that even in autumn he has found the brave spears of its buds already advanced toward a new year. Throughout the Maritime Provinces, Quebec and Ontario, in bogs or along the bases of hills where springs abound, its purple shells (Fig. XII., 1) appear even before the pussies on the willows burst their brown cases. The tiny flowers are closely crowded on a fleshy stalk (Fig. XII., 3) and small as they are, each possesses four sepals, four stamens, and a pistil. The ball-like cluster, termed a spadix, is sheltered from biting cold and cutting winds by a waterproof hood. This shiny brown purple hood resembles a huge mottled snail, and is really a large leaf called a spathe (Fig. XII. 2). It differs, however, from the green foliage leaves which appear later and grow to be one or two feet long. Notwithstanding its repellent smell and early advent, the skunk-cabbage is visited by honey bees; fortunately, however, their plunder does not flavour the honey. Often these honey-seekers meet an unexpected welcome, for spiders have discovered their visits to the flowers, and weaving webs over the spadix, they crouch behind it ready to pounce upon some unwary victim. As soon as the flowers have been pollinated by insects, the hoods wither away and the spadix swells into a round spongy fruit, two or three inches in diameter.

Unlike its relative the calla, this first flower of spring is most unattractive. No complaints, however, can be made in regard to its successors, which possess a mild, deli-

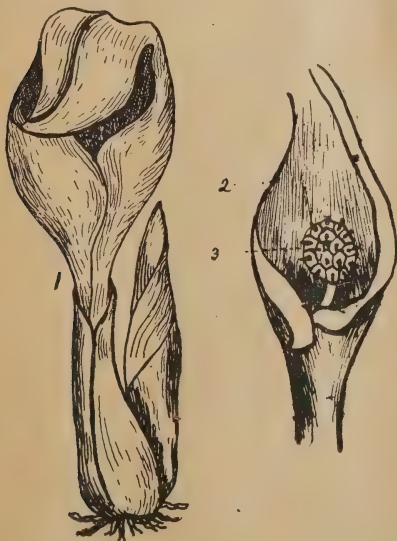


FIG. XII.—SKUNK CABBAGE.



FIG. XIII.—TRAILING ARBUTUS.

cate beauty. Late in April or early in May, according to the season or the locality, several dainty flowers appear almost simultaneously. One of the first is the "rosy-lipped, honey-hearted" trailing arbutus, *Epigaea repens* (Fig. XIII.) Though local in its distribution, it is found in various districts from Newfoundland to the Saskatchewan. Amongst damp moss and withered leaves, in sheltered hollows under the pines, in little dells on dry sandy or rocky ground, its waxy fragrant blossoms abound. Its scientific name means creeping upon the earth, and its slightly woody stem is furnished with evergreen leaves, rounded or heart-shaped. The blades are net-veined and borne on long stalks which are covered with reddish clammy hairs. Here and there, are clusters of pale pink flowers, each blossom having a small calyx of five scale-like sepals. The petals are united into a long tube lined with silvery hairs; the tube spreads out into a flat border having five divisions, each tipped with rose. There are ten stamens, and one pistil with a five-lobed stigma. The flowers have the taste of muscatel grapes, a delicious fragrance, and a rich store of honey, much sought after by bees.

On sunny southern slopes near Montreal, those who venture into the woods about the 20th of April, are often rewarded by finding the first hepaticas. (Fig. XIV.) Though so fragile, they bloom even under the snow;

and in April and May they abound in the rich, dry woods of Eastern Canada. They have been reported as occurring also in Manitoba, the Rocky Mountains, and Alaska. Rusty brown leaves of the previous summer remain over the winter, and afford a pleasing background for the delicate flowers. The hairy flower-stalk bears at its tip a furry bud, enclosed by three sepal-like leaves, collectively termed an involucre (Fig. XIV., 2), which protects the parts within from cold and rain. Soon the bud unfolds and the true sepals are revealed. (Fig. XIV., 2.) They are from six to twelve in number and are coloured white, pinkish-purple, or blue, taking the place of the absent corolla and serving to attract insects. Like many other members of the buttercup family, the flower has a great many stamens, and a pistil of several separate carpels crowded together into a little round head in the centre of the flower. As soon as the seeds have been formed, fresh green leaves unfold ready for their summer's work. Two species of hepatica are found in Canada both with leaves deeply divided into three parts, but those of *Hepatica triloba* have blunt or even rounded lobes, while those of *Hepatica acutifolia* have sharply pointed tips. The former is abundant in the Maritime Provinces and Ontario, but is rare in Quebec; the latter is common about Montreal and all through Ontario, and is found in the other eastern provinces.



FIG. XIV.—LIVERWORT.



FIG. XV.—SPRING BEAUTY.

Like the hepatica opening in the sun and closing in the shade, the spring beauty, *Claytonia virginiana*, (Fig. XV.) appears about the same time. Deep down beneath the surface of the ground is a small round, swollen stem, termed a tuber (Fig. XV., 2), attached to which is a bud. At the advent of spring the bud develops into a long slender aerial stem, bearing two grass-like leaves opposite to one another. At the top, is a loose cluster of delicate flowers. Each has two sepals, five white or pink petals, veined with rose colour, five stamens, and one pistil, with three stigmas. (Fig. XV., 3). This charming flower, with its exquisite fleeting beauty is found in moist open woods throughout the Dominion, having almost as wide a range as its objectionable cousin, the purslane.

Quite as ephemeral as the spring beauty, is the stouter, stronger bloodroot, *Sanguinaria canadensis* Fig. XVI.). In April, the firm tip of its leaf, curled around a flower-bud (Fig. XVI., 2), pushes its way up through the soil, and early in



FIG. XVI.—BLOODROOT.

May rich woods are covered with its gleaming white flowers, golden at the heart. At first a grayish or bluish green, the leaf becomes more brilliant and shows strong veins tinged with orange. After the flowers fall, the large leaves, forming beds here and there in Nova Scotia, New Brunswick, Quebec and Ontario, begin to prepare great quantities of food which is stored up in a thick underground stem or rhizome for the next spring. Like the most of the poppy family, the flower of the bloodroot has two green sepals which fall when the bud expands. The pure white petals from eight to twelve in number are of two sizes (Fig. XVI., 3, 4); there are twenty-four stamens (Fig. XVI., 5); and one oblong, swollen pistil, with a two-lobed stigma (Fig. XVI., 6). The petals fall almost as soon as the flowers are gathered, and the only reminder left to us of the discarded bouquet is the stain left by the orange-red juice from which the plant derives its name.

The sentimental bleeding-heart of the garden has two much more attractive sisters growing wild in our woods. The squirrel corn, *Dicentra canadensis* (Fig. XVII.), is abundant from Nova Scotia to the western boundaries of Ontario. Its underground stem

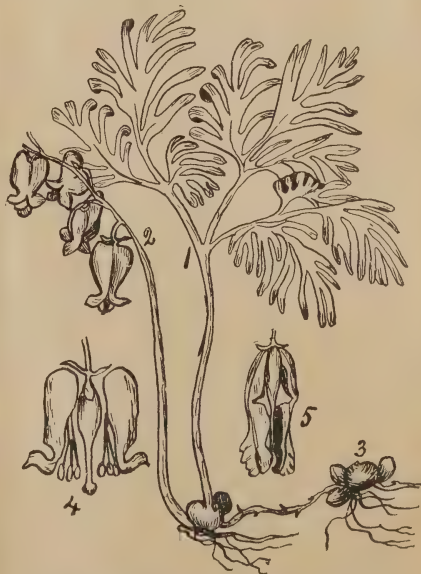


FIG. XVII.—SQUIRREL-CORN.

bears scattered yellow tubers, resembling grains of Indian corn (Fig. XVII, 3). From it spring delicately dissected leaves (Fig. XVII., 1), and graceful clusters of nodding flowers, having the fragrance of hyacinths (Fig. XVII., 2). Each flower is heart-shaped, with two bracts or small leaves near its base, two scale-like sepals, four petals, six stamens in two groups, and one pistil. The petals are of two kinds; the two outer (Fig. XVII., 4), are large pouches, which secrete honey; the inner are narrow and crested (Fig. XVII., 5). The flowers are greenish white in colour, tipped with rose. Dutchman's breeches, *Dicentra cucullaria*, has white flowers touched with cream-colour; the honey pouches are prolonged into spurs, and all the little tubers are collected in one mass resembling a bulb.

It would be wrong to close without any reference to the early saxifrage, *Saxifraga*

virginiensis (Fig. XVIII.), a charming little plant which delights in dry gravelly hill-sides, and ranges from the Atlantic to the Pacific. As a protection from cold, the leaves form a rosette close to the ground. From the centre of the rosette springs one or more flower-clusters. Each blossom has five sepals, five white petals, ten stamens, and one pistil deeply divided into two parts. When ripe the seed-pods have a rich, madder-brown tone, colouring the rocky slopes on which the plants grow. Sturdy but pure, it is a typical product of the spring. About all the early flowers there is a "reticence, an unwrought suggestiveness," missing in flaming midsummer beauties. Strong to resist keen spring breezes, in their delicate purity and dainty forms they seem akin to the snowflakes they succeed.

IV.

OUR SPRING FLOWERS.

Though "half our May's so awfully like may'n't," at last field and wood are tossed full of blossoms, leaves and birds. Masses of white wake-robin glint through the trees, under the maple the violet shyly smiles, and marshes gleam with fairy gold. If the pale, pure beauties of the earliest spring seemed children of the frost-spirit, the marsh marigold is born of the May sunshine. From wave-washed Belle Isle to the Rocky Mountains and as far north as the Arctic Sea, *Caltha palustris* (Fig. XIX.) displays its golden cups. Lonely English settlers dreaming of home misnamed it "cow-slip," and others remembering Shakespeare's "Mary-buds" called it marsh-marigold. Except its golden hue, it has little in common with either; buttercups and crowfoots are its nearest relatives. Borne on a hollow, furrowed stem, the dark green, kidney-shaped leaves make an effective background for the rich flower clusters. All the parts of the flower are separate from one another and inserted on the receptacle (Fig. XIX., 2). There is no corolla, but the golden calyx composed of from five to nine sepals, supplies its place. The numerous stamens (Fig. XIX., 4) produce great quantities of pollen, available as food for winged visitors. The pistil is composed of several distinct carpels, which ripen into little seed-pods (Fig. XIX., 3). Honey is secreted by two shallow depressions on the sides of each carpel in such abundance that it gathers in drops at the heart of the flower, a treasure-trove for hungry bees.



FIG. XVIII.—EARLY SAXIFRAGE.



FIG. XIX.—MARSH-MARIGOLD.

Another dweller in swampy lands is Jack-in-the-pulpit, *Arisaema triphyllum* (Fig. XX.) Delighting in rich black mould, beneath the shade of trees, at his feet a carpet of moss, the quaint little preacher stands in his purple-green pulpit overarched by a graceful striped canopy. The plant has a round underground stem, termed a corm (Fig. XX., 4), which is replaced by a new one at the end of each season's growth. The wrinkled corm is full of an acrid juice, the unpleasant properties of which are dispelled by boiling, rendering the plant a favourite dish with Indians, hence its other popular name, Indian turnip. From the corm spring one or two green leaves, each divided into three leaflets, and the stalk which bears the flower-cluster. Like his cousin, the skunk-cabbage, Jack arranges his flowers on a fleshy spadix, which is, however, elongated and naked at the top and clothed with bloom at the base only. (Fig. XX., 3). Bending gracefully over the spadix, is a thin, hood-like, green spathe,

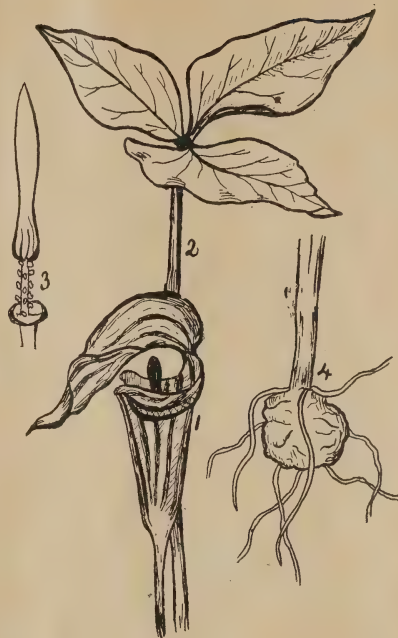


FIG. XX.—JACK-IN-THE-PULPIT.

striped or spotted with purple. The flowers have neither calyx nor corolla, and are of two kinds, the one composed of several closely united anthers, the outer of a single pistil, with a brush-like stigma, composed of delicate spreading hairs. The two may occur on one spadix, the pistillate flowers at the base, the staminate just above. But in order to ensure cross-pollination steps towards the complete separation of the two kinds of flowers have been taken. It will be noticed that some plants are larger than the average, while others are smaller and possess only one leaf. The latter bear staminate flowers exclusively, and as soon as the pollen is shed, spathe and spadix wither away, and the plant proceeds at once to prepare for the next season's growth. Pistillate plants have, however, not only to produce blossoms but to mature seeds, storing in these an abundance of food for the tiny plants within. Not until this work is completed can the parent plant think of itself and form a corm and bud for the coming year. Great-

er demands necessitate more nutriment; therefore, pistillate plants are large and provided with two leaves. Notwithstanding this, they sometimes become so exhausted in ripening fruit, that during the next season they remain small and produce only staminate flowers. Surely, Jack's sermon has "economy" for its text. *Arisaema triphyllum* flourishes in all the eastern provinces and even in Manitoba; but its inter-



FIG. XXI.—COMMON BLUE VIOLET.

esting brother, the green dragon, *Arisaema dracontium*, seems to be confined to a small area in south-western Ontario. The latter has a leaf with from seven to eleven leaflets, and its spathe is pointed and greenish.

Flooding the swamps, fringing the hills, and lurking in shady nooks on the hillside are the best-loved flowers of spring, the violets. Twenty species, white, yellow and blue, have been observed in Canada, several finding congenial homes in every part of the Dominion. Perhaps the best known is the common blue violet, *Viola cucullata*, (Fig. XXI.) Enriching meadows and bordering woodland brooks, its kidney-shaped or rounded leaves of wavy outline grow directly from a fleshy rootstock. The flowers, varying in colour from pale blue to deep purple are borne singly on slender, naked stalks. The calyx has five sepals extended into ears at the base. Of the five unequal

petals, the two lateral are bearded and the lowest one is prolonged into a spur which holds honey. Two of the five stamens have nectar-secreting spurs, which project into that of the corolla. The slightly coherent stamens surround the three-lobed ovary and the single stigma is bent slightly to one side. The colour, the secretion of honey and the irregular form of the flower are intended to secure cross-pollination. It is, therefore, astonishing to find the plant bearing other bud-like flowers concealed beneath the leaves or below the surface of the ground. (Fig. XXI., 1.) Though they never develop petals, never open and are necessarily self-pollinated, they are even more fertile than the ordinary blossoms. Charming as are these "lovely children of the shade," the blue violets have no perfume. Canada has, however, its fragrant species. Low wet woods are often filled with *Viola blanda*, a white violet daintily veined with brownish-purple, its tiny blossoms breathing forth a faint sweet perfume. Fragrant with the same delicate elusive scent as pansies is the tall Canada violet, *Viola canadensis*. With leafy, upright stems, one or two feet high, and large white flowers veined with purple and mauve beneath, these violets are among the loveliest of the family. Occurring in every part of Canada on rich wooded slopes, they easily bear transplanting and well repay cultivation. A scentless leafy-stemmed species is the downy yellow violet, *Viola pubescens*, celebrated in charming but inaccurate verse by Bryant. The lower petals are veined with purple, the lines serving insects as path-finders, pointing to the hoard of honey.

Notwithstanding the poetic fancies woven about the violet, another flower is the reigning beauty of a Canadian May. The large white wake-robin, *Trillium grandiflorum* (Fig. XXII.), glinting from copse and wood, is without a rival in purity and abundance. Throughout Quebec and Ontario, it fills rich woods giving a distinctive charm to every landscape. Like other members of the lily family, it is built upon the plan of three. From a short rootstock (Fig. XXII., 1) arises a stem bearing a whorl of three green leaves (Fig. XXII., 2). Its large terminal flower (Fig. XXII., 3) has a calyx of three green sepals; a corolla composed of three pointed white petals, which flush a delicate pink in old age; six stamens (Fig. XXII., 4); and a pistil with three spreading anthers (Fig. XXII., 5). Exquisite in their chaste white beauty, the flowers are scent-



FIG. XXII.—LARGE WHITE TRILLIUM less and nectarless and depend upon the brilliant corolla to attract pollen-gathering bees and wasps. Similar in the number and arrangement of the various organs are the painted trillium, *Trillium erythrocarpum*, with a crimson blotch at the base of its petals; the smiling wake-robin, *Trillium cernuum*, nodding upon its stalk; and the madder-red birthroot, *Trillium erectum*, a dingy poor relation. The trilliums are essentially a North American group, a few Japanese and Himalayan species being the only exceptions.

A less conspicuous flower also belonging to the lily family is the bellwort, *Oakesia sessilifolia* (Fig. XXIII., 1). Its graceful, curving stem, about eight inches high, bears several pale green leaves, which are set close upon the stem almost clasping it. Beneath them modestly droop one or two straw-coloured lily-shaped flowers. The sepals and petals resembling one another in colour and form, are spoken of collectively as a perianth. The fruit is sharply angled or even winged (Fig. XXIII., 2). Closely allied and having the same common name is *Uvularia grandiflora*. It differs from *Oakesia* in having a short thick rootstock instead of a



FIG. XXIII.—BELLWORT.

slender creeping one; in possessing perfoliate leaves, i.e., leaves through which the stem apparently passes (Fig. XXIII., 3); and in having callus-like ridges at the base of the inner surface of the petals. *Uvularia* is common throughout Quebec and Ontario, while *Oakesia* abounds in New Brunswick and Quebec.

One of the lily group and not a violet, as its common name would indicate, is the dog's-tooth violet or adder's tongue, *Erythronium americanum* (Fig. XXIV.). In rich woods from Nova Scotia to Georgian Bay, its drooping bells greet the new-born spring. Arising from a deeply-seated bulb (Fig. XXIV., 1) are two shining leaves, pale-green mottled with a purplish tint (Fig. XXIV., 2). Sheathed at its base by the leaves, the slender flower-stalk terminates in a large, nodding, russet-yellow flower (Fig. XXIV., 3). The perianth is composed of three recurved sepals, striped with brown, and of three petals grooved on the inner surface and dotted at the base with purplish-brown. The six stamens (Fig. XXIV., 5) have awl-shaped filaments and oblong anthers; the pistil (Fig. XXIV., 6) is provided with a long style and one three-lobed stigma. Scattered among the larger plants are younger ones having only one leaf, no blossom, and a bulb situated near the surface of the earth. Each year, new bulbs are produced at the ends of runners springing from the parent



FIG. XXIV.—DOG'S TOOTH VIOLET.

bulb and each summer they penetrate more deeply into the soil. Finally the deepest bulbs send up pairs of leaves and blossoms.

The spring flowers hitherto described have been more or less conspicuous, but other widely distributed plants are seldom noticed, for example, the wild ginger, *Asarum canadense*. (Fig. XXV.) From its aromatic rootstock grow two long-stemmed kidney-shaped leaves, covered with soft hairs (Fig. XXV., 1). Close to the ground in the fork of the leaves, and attached to a short stalk is a single purplish-brown flower (Fig. XXV., 2). There is no corolla and the calyx is bell-shaped with a spreading three-lobed border (Fig. XXV., 6). The twelve stamens joined to the style have curious filaments prolonged beyond the anther into a point (Fig. XXV., 4); and the pistil, united at its base with the calyx tube, ends in six spreading stigmas. It is common in rich woods amongst dead leaves from the Atlantic Coast to the Saskatchewan River, and has long furnished Indians and simplers with a favourite medicine, the pungent rootstocks with the flavour of ginger being considered a cure for headache and deafness. Thus, whether utilitarian or aesthetic,

"The country-born an' bred know where to find

Some blooms that make the season suit the mind."



FIG. XXV.—WILD GINGER.

V.

FLOWERS "WHOSE MONTH IS EVER MAY."

The character of plant societies is largely a matter of environment, the slightest differences in soil, climate, etc., affecting the geographical distribution of species. In temperate regions, however, conditions are not extreme, and it might be expected that the same species would prevail throughout the Dominion of Canada in similar latitudes. But the floras of the East and the West are most unlike, and few forms are common to both sides of the Rocky Mountains. Among these exceptional plants may be mentioned the white baneberry, *Actaea alba* (Fig. XXVI.), found in rich woods, near streams, in cool, shady nooks, from Nova Scotia to British Columbia. Cohosh, herb-



FIG. XXVI.—WHITE BANEBERRY.

christopher and rattlesnake herb, are other common names for this plant, which is a rather coarse perennial, growing about two feet high. Each spring the rootstock sends up compound leaves, twice or thrice divided, with sharply cut and toothed leaflets (Fig. XXVI.). The blossoms are very small and delicate, and even the fuzzy white clusters (Fig. XXVI., 2, 4) are neither attractive nor conspicuous. The floral organs are quite separate and inserted on the receptacle. Both the sepals and petals, from four to five in number, are extremely small, and the former fall as soon as the flower expands. More noticeable than either are the numerous stamens with their slender white filaments. Each flower has one pistil with a depressed two-lobed stigma, and a one-celled ovary, which ripens into an oval berry. The clusters of berries, which appear late in the summer, are more striking in appearance than the flowers. Waxy-white, marked with a purplish black spot, they are borne on thick stems, which turn red when the berries are ripe (Fig. XXVI., 3). A taller and stouter form, *Actaea alba*, variety *arguta*, occurs in British Columbia, ranging from Washington Territory to Alas-

ka. The European species with purplish black berries has not been observed in America, though a variety known as the red baneberry, *Actaea spicata*, variety *rubra*, is common in rich woods from Nova Scotia to the Rocky Mountains. It is exclusively a forest plant and a more Northern form than the white baneberry. Its leaflets are less deeply cut, and it blossoms a week or two earlier than the *Actaea alba*. The cherry-red berries borne on slender stems are, like those of other forms, non-edible. Curious variations, probably due to the inter-crossing of species, appear, and occasionally white berries on slender stalks, and red berries on thick stems are found. Like the hepatica and the marsh marigold, the baneberry belongs to the crowfoot family, a group in which are found many common spring flowers.

One of the daintiest of these is the goldthread, *Coptis trifolia*. (Fig. XXVII.) This charming little plant, not more than from three to five inches in height, rejoices in shining evergreen leaves, each of which is divided into three sharply-toothed leaflets. These beautiful symmetrical leaves arising from a slender rootstock form a rich carpet for wet woods and bogs from Labrador to the Rocky Mountains. The the locality from May to September. The anemone-like flowers appear according to blossoms are borne singly on scapes, that is, on leafless stalks springing directly from the rootstock. The calyx or from five to seven petal-like sepals falls early, but the corolla persists longer. The so-called stam-



FIG. XXVII.—GOLDTHREAD.

inodes, from five to seven in number, are club-shaped petals, pale yellow at the base, and hollowed out at the tips so as to form gold-coloured nectar-cups. Each flower possesses from fifteen to twenty-five stamens and a pistil composed of from three to seven separate carpels, which ripen into divergent pods with slender stalks and long tapering styles. (Fig. XXVII., 2.) It is represented in British Columbia by the spleen-wort-leaved goldthread, *Coptis asplenifolium*. Goldthread is one of the best known wild flowers, utilitarian minds having appreciated its medicinal properties though often insensible to its beauties. Even now, country herbalists regard it as an excellent tonic in cases of fever and ague, and a wash made from its bitter, bright yellow rootstock and roots is used for ulcerated throats.

More than a passing glance is needed to



FIG. XXVIII.—WHITE COLUMBINE.

detect the close relationship between goldthread and columbine (Fig. XXVIII.), although the latter is a cousin of the crowfoots. The wild columbine, *Aquilegia canadensis*, is highly modified in order to secrete honey and attract insects, but all parts of the flower are separate from one another. No more graceful plant grows than the columbine, whose gem-like flowers flaming with scarlet and yellow bedeck precipitous cliffs and rocky wooded hillsides. Finding

a foothold in every crack and crevice, it has its favourite haunts throughout the eastern and central parts of Canada, but is replaced by a yellow-flowered variety west of the Saskatchewan. Though so widely distributed it is not very abundant and in many places ruthless philistines by uprooting or gathering it in handfuls have deprived later-comers of the pleasure enjoyed by Emerson, who in the rock-loving columbine found a salve for his worst wounds. This exquisite perennial has much divided compound leaves, and large vivid flowers (Fig. XXVIII., 2), scarlet without and yellow within, nodding from the top of slender, branching, leafy stems from one to two feet in height. (Fig. XXVIII., 1.) The five sepals, coloured like petals, are regular in form. Between them are the five petals, each with a short spreading lip and a long hollow spur which projects backwards between two sepals forming a storehouse for nectar.

"The graceful columbine all blushing red,
Bends to the earth her crown
Of honey-laden bells,"

which are eagerly sought by bees and humming-birds. The numerous stamens and five carpels with long styles form a delicate golden fringe at the mouth of the bell, nodding upon its stem. Later, however, the flower-stalk straightens, and the many-seeded pods stand erect in a cluster tipped with long pointed styles (Fig. XXVIII., 3). In the charming flower, with its claw-like spurs, has been seen a resemblance to a bird's foot, and not only the scientific name, from aquila, an eagle, but also the word columbine, from columba, a dove, has its origin in this fancied likeness. Dr. Prior, however, thinks the common name was given because of the resemblance of the nectaries "to the heads of pigeons in a ring around a dish, a favourite device of ancient artists." A blue or purple species, *Aquilegia brevistyla*, occurs in the North-West Territories, and the stouter, coarser European columbine with blue, purple or white blossoms has escaped from cultivation and is now found growing wild in Nova Scotia and New Brunswick.

Blooming at the same time and in similar cool nooks may be seen the mitrewort, *Mitella nuda* (Fig. XXIX., 1). From the Atlantic to the Pacific, it flourishes in swamps or beds of damp moss. It spreads by means of long, slender runners, from which are produced the rounded or kidney-shaped leaves with deep, round

teeth and a clothing of soft hair. The small, greenish-white flowers, few in number, are arranged in a loose cluster at the top of a slender scape. Occasionally, however, the flower-stalk bears a small leaf.



FIG. XXIX.—MITREWORT OR BISHOP'S CAP.

Each flower has five short sepals united at the base in a tube, to which are attached five petals and ten short stamens. Only five of the latter are indicated in the illustration (Fig. XXIX., 2); the others have been removed in order to show the form and arrangement of the deeply-cut, fringed petals. The single pistil, with two short styles, develops into a small pod resembling a bishop's mitre, hence both the scientific and common names of the plant. Three other species of *Mitella* have been found in British Columbia, and *Mitella diphylla* is abundant in the woods and on the banks of streams in Quebec and Ontario. This form has basal leaves, heart-shaped, sharply pointed and deeply cut; in addition, the flower-stalk is furnished with two smaller, opposite leaves. The blossoms are white and are grouped in slender clusters more closely crowded than the flowers of *Mitella nuda*.

Frequently called false mitrewort, and also a member of the Saxifrage family, *Tiarella cordifolia* (Fig. XXX.) often occurs in

the same localities as *Mitella diphylla*. Somewhat rare in Nova Scotia and northern New Brunswick, but common near Fredericton and in the rich woods of Quebec and Ontario, it gives way to *Tiarella unifoliata* and *Tiarella trifoliata*, on the north-west coast. Although lacking in perfume, it is



FIG. XXX.—FALSE MITREWORT OR FOAM FLOWER.

sometimes called the wood mignonette, from a very slight resemblance between its flowers and those of the true mignonette. Its leaves appear fresh and bright from beneath their covering of snow. the root-stock and summer runners giving rise to others later.

In shape they resemble small narrow maple leaves (Fig. XXX., 1); but they have dark veins, are shaded with purple in the centre, and are covered with short hairs. Rising about eight inches above the ground is a dainty cluster of white flowers, so delicate as to make the name "foam-flower" most appropriate. The calyx is bell-shaped and five parted, and to it are attached five small white petals, entire or but slightly

toothed (Fig. XXX., 3), The ten stamens also united to the calyx are long and slender, with orange-tipped or light brown anthers. As in the true mitrewort, the seed-pod has the form of a bishop's cap or crown, this peculiarity being indicated by the generic name, a diminutive of tiara, a turban or crown.

A walk to rich cool woods will probably add to this sylvan bouquet, the yellow clintonia, *Clintonia borealis* (Fig. XXXI.), the foliage and fruit of which are more beautiful than the flowers. *Clintonia* is classed with the lilies and its dark shining foliage is not unlike that of the lily-of-the-valley. A cluster of large, oblong, polished leaves, hairy on the margins, arises from a slender root-stock. Sheathed at its base by the leaves, a scape from 5 to 8 inches high is crowned by a cluster of drooping bell-shaped flowers. The cluster, termed an umbel, is



FIG. XXXI.—CLINTONIA BOREALIS.

usually composed of from three to six flowers, but occasionally the blossom is solitary. Each flower has a perianth with three sepals and three petals, varying in hue from green-

ish-yellow to pale straw-colour. The perianth falls comparatively early, and carries with it the six stamens which have long thread-like filaments. The pistil then becomes a beautiful, blue, oval berry, the fruit clusters forming an exquisite contrast to the rich foliage which carpets eastern woods. *Clintonia borealis* is abundant from Labrador to Quebec, and is very common in the cedar swamps of Central Ontario. Thence it extends to the Saskatchewan, while *Clintonia uniflora* represents the genus on the Pacific coast.

These are only a few of the woodland beauties whose month is May. From east to west there is now a plenitude of floral wealth, embarrassing in its richness. From gray lichen-covered rock to the heart of the swamp, nature-lovers turn with ever fresh delight and meet scores of friends in a single morning's walk.

VI.

"THE THROBBING HEART OF MAY."

Nature is never more prodigal than at the passing of May. "Anticipating wealth from summer skies, delight is a-tiptoe" at a carnival of flowers. Among the most charming offspring of the merry month are tremulous anemones "from the soft wing of vernal breezes shed." Dancing on their stalks, wind-flowers, *Anemone nemorosa*, whiten thick woods. These fragile plants (Fig. XXXII.) are most appropriately named after the wind-shaken flower of the Greeks, which was supposed to have sprung from the blood of the slain Adonis. From a thread-like rhizome (Fig. XXXII., 1) arises a slender stem, bearing an involucre of three leaves, each of which is stalked and divided into three deeply-cut leaflets (Fig. XXXII., 2). Above the involucre sways the dainty flower, about one inch in diameter (Fig. XXXII., 3). It has no corolla, but the sepals, varying in number from four to seven, are generally ivory-white though occasionally suffused with purple or a delicate crimson-pink. The flower resembles its relative the marsh-marigold in structure, but the carpels ripen into a head of small one-seeded fruits, each terminating in a hooked beak (Fig. XXXII., 4). Sterile plants occur which have a solitary leaf resembling those of the involucre of fertile plants, but springing directly from the rhizome. The wind-flower spreads from the east to west of the Dominion, but its relative the pasque-flower *Anemone patens*, variety *Nuttalliana*, is

the special pride of the prairies. This exquisite plant with silky cup-shaped involucre and large blue or purple blossoms, is one of the most beautiful spring flowers of central Canada. Though they blossom from June to August, three other members of the genus may be mentioned now. The red wind-flower, *Anemone multifida*, displays its red blossoms in every part of the country even on Arctic shores. Occasionally, variations with greenish-yellow or whitish flowers are found. The thimble-weed, *Anemone cylindrica*, so called from its elongated fruit-cluster, has the same eastern and western limits as the last spe-



FIG. XXXII.—ANEMONE OR WIND-
FLOWER.

cies, but does not extend so far north. Its common name is sometimes wrongly given to the tall anemone, *Anemone virginiana*, which abounds in dry rocky woods and on river banks east of the Rocky Mountains. This form possesses coarse foliage and ivory-white sepals covered on the outside

with silky hairs. The fruit-cluster is oblong but much shorter than that of the thimble-weed.

Blooming about the same time as the wind-flower, the pretty tooth-wort, *Dentaria diphylla* (Fig. XXXIII.), abounds in the rich moist woods of Nova Scotia, New Brunswick, Quebec and Ontario. The scientific name of the genus, as well as the common names, crinkle-root, pepper-root, tooth-wort, are descriptive of the wrinkled, toothed rootstock (Fig. XXXIII., 1), with its pleasant pungent flavour. The short stem is furnished with a pair of leaves, each divided into three coarsely-toothed leaflets



FIG. XXXIII.—TOOTHWORT.

(Fig. XXXIII., 2), and is terminated by a cluster of white flowers (Fig. XXXIII., 3). All the organs are arranged in groups of two. Each flower has two pairs of sepals and two of petals, so placed that the corolla has the appearance of a cross with equal arms. This arrangement being characteristic of all mustards and cresses, the family has been named the Cruciferae from *crux*, a cross. There are six stamens, two of which are

shorter than the others (Fig. XXXIII., 4). The pistil is composed of two united carpels, and the fruit is a long, flat pod (Fig. XXXIII., 5). Another species, *Dentaria laciniata*, which has a tuber instead of a rhizome, less deeply cut leaves, and white or rose-coloured flowers, is rare in Quebec, but is found in several parts of Ontario.

Currants and gooseberries are very unlike their cousins the mitreworts and saxifrages in general appearance, but they are even more common throughout the Dominion in May. Sixteen species are found growing wild in Canada, the most widely distributed being the northern or hawthorn gooseberry, *Ribes oxyacanthoides*. (Fig. XXXIV.) In Ontario it prefers swamps, but its favourite haunts in the interior are the margins of lakes and rivers. It most be stated, however, that the prairie form differs greatly from the eastern, causing Macoun to think that Gray may have described two species as one. It is possible that the variety found on the prairies with its numerous scattered spines should be classed as the bristly gooseberry, *Ribes setosum*. The northern gooseberry is a little

shrub bearing bunches of small lobed leaves, which are smooth, shining and pale on the underside (Fig. XXXIV., 1). Small short-stemmed clusters of flowers arise from the same points as the leaves (Fig. XXXIV., 2). Each greenish or dull purple blossom (Fig. XXXIV., 3) has a calyx composed of five sepals united at their bases into a short tube and joined to the ovary. The five petals and five stamens are short and inserted on the calyx tube. The pistil has two styles and stigmata, and the fruit is a berry with a smooth skin and pleasant flavour (Fig. XXXIV., 4). Several species, for example the large-berried gooseberry, *Ribes cynosbati*, of eastern Canada, have prickly fruit. The flowers of the currants are similar to those of the gooseberries, but the bushes are destitute of thorns or prickles, and the leaves and fruits are somewhat different in appearance. The fetid currant, *Ribes prostratum*, frequently found east of the Rocky Mountains, has heart-shaped leaves and pale red, slightly bristly fruit. The wild black currant, *Ribes floridum*, with heart-shaped leaves sprinkled with resinous dots, and with long drooping clusters of whitish flowers, has not been found west of Manitoba. This genus has not been materially altered in appearance by cultivation, attention having been almost exclusively directed to the improvement of the fruit.

Artificial selection has wrought similar changes in several members of the apple-family; the fruit has been greatly modified, while leaves and flowers have retained their ancestral characteristics. Therefore, few wild forms belonging to the family need description, but some allusion must be made to certain species which are rarely cultivated. The shad bush, *Amelanchier canadensis* (Fig. XXXV., 3), is an exquisite shrub or a small tree flowering, according to the latitude, from the last of April to the last of May, at the same time as its leaves unfold. Some say that its blossoms are flung across the stream when the shad begin to run, others that it blooms when shadflies make their first appearance. Its crimson fruits ripen in June and thus has originated another name, "June-berry." In the North-West, the berry-like fruits are much valued and eaten both by Indians and white settlers, who call the tree the service-berry. The shad bush has crimson or purple bud-scales and stipules, glossy silken leaves, and pure white flowers which add greatly to the charm of the May woods. The flowers resemble those of the apple in



FIG. XXXIV.—NORTHERN GOOSEBERRY.



FIG. XXXV.—CHOKO CHERRY AND JUNE BERRY.

the number and arrangement of the various organs, but the petals are much longer and narrower. The five-toothed calyx is downy within and to it are attached five petals and numerous short stamens. The pistil has a five-celled ovary and five separate styles. Two varieties of *Amelanchier canadensis*, passing into one another by almost imperceptible gradations, occur in Canada. The one is a tree from fifteen to thirty feet in height, the other is shrubby and from six to ten feet high. The former is common east of Lake Superior, the latter prevails from this point to the Rocky Mountains, being replaced in British Columbia by another species, *Amelanchier alnifolia*, with broader leaves, deeply toothed at the top. In the apple family the calyx-tube is united with the ovary (Fig. XXXV., 4) and finally becomes thick and fleshy, forming the greater part of the edible portion of the fruit. But in the closely allied plum family the calyx is free from the ovary and only the latter goes to form the

fruit (Fig. XXXV., 2). The choke-cherry (*Prunus virginiana*) may be considered a type of this family and is one of the most widely distributed wild species. It has large pointed leaves, long flower-clusters (Fig. XXXV., 1), and dark crimson fruits, unusually large and sweet in the form which occurs on southern prairies.

Among the shrubs which flower in May, must be mentioned the American fly-hon-



FIG. XXXVI.—AMERICAN FLY-HONEYSUCKLE.

honeysuckle, *Lonicera ciliata* (Fig. XXXVI.), which delights in upturned stumps in damp, rocky woods. This straggling bush, about four or five feet in height, is quite common from Nova Scotia to the Saskatchewan River, and is occasionally found in British Columbia. From the axils of the opposite leaves (Fig. XXXVI.), graceful bells sway on slender stalks (Fig. XXXVI., 2). The flowers, which are arranged in pairs, have two tiny bracts (Fig. XXXVI., 3), at the base of each small green ovary. The calyx is closely attached to the latter and the only evidence of sepals are five very small teeth at the top of the ovary (Fig. XXXVI., 4). The pale primrose-yellow corolla, three-quarters of an inch long, is

tubular, with five lobes. A small nectary resembling a spur (Fig. XXXVI., 5), projects from one side of the tube near the base. Little thieves, too short-tongued to suck the honey in the orthodox manner, have learned a mischievous trick. Gnawing a hole in the spur, they steal the store of honey, and fly away without paying for their meal with pollen brought from another flower. Five stamens (Fig. XXXVI., 6) are attached to the corolla-tube; and the single style is bent to one side. The fruits are oblong, ruby-red berries, which are most attractive to flies, which seek them in such numbers as to give the plant its common name. The mountain fly-honeysuckle, *Lonicera caerulea*, which is found in mountain woods and bogs, is similar to the American fly-honeysuckle in most respects, but in ripening the ovaries of each pair of flowers become united into one blue berry. Several charming shrubs belonging to the honeysuckle family blossom about the last of May. Of these, the hobble-bush, *Virburnum lantanoides*, is one of the most attractive. It has broad, heart-shaped leaves, and large, flat clusters of flowers, of which the outer are furnished with enlarged five-lobed corollas, but have neither stamens nor pistils. It occurs in cool, damp woods, from Nova Scotia to Lake Superior, but its cousin, the

red-berried elder, *Sambucus pubens*, is found in rocky places from the Atlantic to the Pacific. The latter has compound leaves of from five to seven leaflets, large convex clusters of small whitish flowers, and bright red berries which ripen in June.

Although the spring glory of the lily family is vanishing, several graceful members of the group are in their prime. In rich woodlands or bowing between fence-rails, the curving stems of the smaller Solomon's seal, *Polygonatum biflorum* (Fig. XXXVII.), abound from Nova Scotia to the western shores of Lake Superior. The flowers are arranged in pairs drooping underneath the stem (Fig. XXXVII., 2). The greenish or straw-coloured sepals and petals are united into a six-lobed perianth, to which are attached six stamens (Fig. XXXVII., 3). Later in the summer, the blossoms are succeeded by pretty dark-blue berries. The common name of the plant was given to it, because of round marks resembling the stamp of a seal (Fig. XXXVII., 1) upon the rhizome, the scars indicating the position of the aerial stems of former years. Found from Western Ontario to the Saskatchewan River, the great Solomon's seal, *Polygonatum gigantum*, often reaches a height of six or seven feet. The stems are clothed with large clasping leaves; and there are from two to eight flowers in each cluster.

The wild spikenard, *Smilacina racemosa*, (Fig. XXXVIII.), is often called false Solomon's seal, but it bears little resemblance to



FIG. XXXVII.—SOLOMON'S SEAL.



FIG. XXXVIII.—FALSE SOLOMON'S SEAL.

polygonatum. The small white flowers are grouped in one large terminal cluster and are followed by pale red berries speckled with purple. It is much more widely distributed than Solomon's seal occurring in moist thickets from the eastern to the western shores of Canada. At first glance, twisted stalk (*Streptopus roseus*) seems to resemble Solomon's seal more closely, but its rose-purple bells are borne on twisted stalks, either singly or in pairs, and the parts of the perianth are not united.

The flowers described are only types of those profusely spread abroad by bounteous May. Therefore, he who would appreciate each new creation to the full, must daily wander far a-field, seeking visions of fresh beauty before their loveliness fades away.

VII.

"THE LEAFY MONTH OF JUNE."

The world is now a symphony in green. The sunlight, filtering through myriads of leaves and dancing on mossy bank and grassy knoll, still brightens many a dainty blossom lingering in shady nooks. But the borders of open woods, the corners of fences, the margins of lake and river are summer's treasure-houses. Already dandelions "paint the meadows with delight," and daisies are beginning to open their eyes. There is no lack of less familiar beauties. In open woods and through the fence-rails the wild geranium waves its graceful stems. From Newfoundland to Manitoba, *Geranium maculatum* (Fig. XXXIX), flourishes in open grassy thickets, branching repeatedly and reaching a height of two feet. The basal, heart-shaped leaves, divided into five wedge-shaped lobes, are borne on long stalks, and in old age become covered with whitish or purplish blotches (Fig. XXXIX., 1). The stem leaves are much smaller, and one pair generally forms an involucre at the base of the loose flower cluster (Fig. XXXIX., 2). The light purple flowers, which sway on slender stalks, are few in number (Fig. XXXIX., 3). Each has five pointed sepals, covered like stem and leaves with hair; and five petals about half an inch in length and bearded at the base. The ten stamens are arranged in two whorls, the five longer having glands at their bases. The pistil is the most interesting organ of the flower, as it is a clever contrivance for shooting the seeds out into the world. It is composed of five closely united carpels (Fig. XXXIX., 4), the styles



FIG. XXXIX.—WILD GERANIUM.

forming a long beak, on account of which the name geranium or "crane's bill" was given to the plant. When the seeds are ripe, the five parts separate at the bottom from the central axis (Fig. XXXIX., 5); and, curling backward, hurl the seeds into the air, as stones are flung from a sling. Thus the young plants are given a fresh start in life at a distance from exhausted soil, old foes, and, most dangerous rivals, immediate relatives. Of even wider geographical distribution, *Geranium carolinianum*, ranges from the Atlantic to the Pacific. Its pale rose-coloured flowers and much dissected leaves make it one of the prettiest ornaments of lately burnt woodlands and of thickets, where the soil is sandy or barren. A smaller species, Herb Robert, *Geranium Robertianum*, has not been found west of the Lake of the Woods. In spite of its disagreeable odour, its reddish-purple

flowers and divided-leaves, becoming bright red in autumn, render it a great attraction in shady ravines.

In woodland and meadow are numerous representatives of the rose family, a group which contains not only familiar strawberries and raspberries, but many genera with non-edible fruits, for example the cinquefoil. The shrubby cinquefoil, *Potentilla fruticosa* (Fig. XL.), may be taken as the type of the twenty-eight Canadian species. It is an erect, shrubby perennial, common on the rocky margins of rivers and lakes throughout the Dominion, ascending almost to the snow-line in the Rocky Mountains. The many branches are thickly beset with silky leaves. Each may be divided into seven parts, but the usual number of leaflets is



FIG. XL.—SHRUBBY CINQUEFOIL.

five (Fig. XL., 1), hence the common names cinquefoil and five-finger. The flowers, which occur either singly or in small clusters, look like yellow strawberry blossoms. The sepals (Figs. XL., 2; XLI., 4) are united at the base and have between them small bracts (Figs. XL., 3; XLI., 5), causing the calyx to appear ten-lobed. The five petals and numerous stamens are united to the calyx-tube; but the pistil is free and composed of several separate carpels which ripen into a head of small one-seeded fruits. The marsh five-finger, *Potentilla palustris*, has the same range as the shrubby cinquefoil, but makes its home in bogs and marshes. Its leaflets are toothed instead of entire, and the calyx is an inch in breadth and dark purple within. Although it is found

from the Atlantic to the Pacific, the tall or glandular cinquefoil, *Potentilla arguta*, abounds in dry rocky thickets and upon prairies chiefly west of the province of Quebec. Growing from one to four feet



FIG. XLI.—TALL AND ROUGH CINQUEFOIL.

high, it bears close clusters of large white flowers (Fig. XLI., 2). The basal leaves are composed of from seven to eleven leaflets (Fig. XLI., 1), but the upper leaves have few divisions. Another common species is the rough cinquefoil, *Potentilla norvegica*, which frequents cultivated grounds, river banks, and lake-shores east of the Rocky Mountains. It seldom exceeds two feet in height and is often much lower. Each of its leaves is divided into three leaflets (Fig. XLI., 3), and its yellow flowers (Fig. XLI., 4) are grouped in a close, leafy bunch. The name of the genus is derived from the Latin *potens*, powerful, and was originally given to the silver-weed, *Potentilla anserina* because of its supposed medicinal virtues. The silver-weed is a low-spreading plant, covered with whitish, silky hairs.

Carpeting cool sandy woods, the dwarf cornel or bunch-berry, *Cornus canadensis*, is a worthy successor of earlier sylvan beauties. It is found from the extreme east to the west of the continent and vanishes in the north at the limits of the spruce, the most northern of all the Canadian conifers. The bunch-berry possesses an unbranched aerial stem, not more than seven inches in height. A few scale-like leaves are borne upon it near the base, and at the top is a cluster of larger leaves so closely crowded as to form a whorl, (Fig. XLII., 1). From the centre of this bunch, a short stalk bearing a cluster of

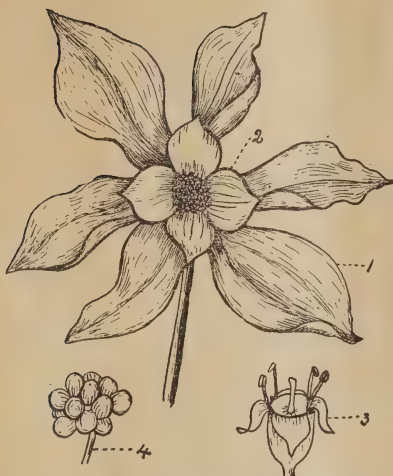


FIG. XLII.—DWARF CORNELL.



FIG. XLIII.—STAR-FLOWER.

flowers arises. At first glance, this seems to be one large creamy blossom; but the four large leaves resembling petals are bracts (Fig. XLII., 2), forming an involucre about a close head of very small greenish flowers. Small as they are, each has a minutely toothed calyx, four oblong petals, four stamens, and a pistil with one style (Fig. XLII., 3). The ovary is closely united to the calyx-tube, and the two ripen into a bright red berry. (Fig. XLII., 4). The flowers are too inconspicuous to attract insects, therefore the dwarf cornel has developed its showy involucre which serves as well as the brightest of petals to call attention to the feast spread for winged visitors. A similar involucre is present in the flowering dogwood, *Cornus florida*, a tree which occurs in Ontario. These bracts are, however, lacking in the shrubby dogwoods, of which there are several Canadian species. Of these, the red-osier dogwood, *Cornus stolonifera*, is found in low grounds from the Atlantic to the Pacific Ocean. It is easily recognized by its bright reddish-purple, osier-like branches, and by its small, loose clusters of white or lead-coloured fruit. Macoun calls it the kinnikinnik, a name usually applied to the silky cornel, *Cornus sericea*, a species with purplish twigs and pale blue fruit, occurring in eastern Canada.

The delicate star-flower, *Trientalis americana*, is also in its prime in June, studding damp, grassy woods from Newfoundland to

the Saskatchewan River. In the arrangement of its leaves (Fig. XLIII., 1), and the form of its flowers, the plant is an embodiment of the idea of a star. As *Trientalis* implies, it is about one-third of a foot in height. The stem, which springs from a very long, slender rhizome, usually bears a few scale-like leaves below, and a whorl of thin, delicately veined leaves at the top. From the middle of the whorl arises one or more fragile, frosty-white flowers. The stamens, the lobes of the calyx, and those of the corolla are all seven in number, but the pistil has a one-celled ovary and a single style. As a rule, in flowers, each whorl of organs alternates with adjacent groups, that is, the petals stand in front of the spaces between the sepals, and the stamens divide the angles between the petals. But in the star-flower, as in other members of the primrose family, the stamens stand opposite to the petals. The explanation usually given is that in the ancestral form of the family there was another circle of stamens alternating with the petals, and standing between them and the inner stamens, but the outer whorl has been suppressed in the descendants.

Turning from the woods again, the thyme-leaved speedwell, *Veronica serpyllifolia* (Fig. XLIV.), will be found. Though it is often seen in cultivated grounds, it is probably a native of Canada, flourishing in pas-



FIG. XLIV.—THYME-LEAVED SPEEDWELL.

tures and along ditches, in every part of the Dominion. The simple branches from two to four inches in height bear several pairs of rounded leaves (Fig. XLIV., 1) at the base, but these gradually merge into the small, slender bracts (Fig. XLIV., 2) of the loose flower-clusters. Each blossom has a tiny calyx, and a pale blue corolla striped with a darker shade. Of the four petals united at their bases, the upper is the largest (Fig. XLIV., 3). There are only two stamens, and the pistil with its slender style has a two-celled ovary, which ripens into a broad, flat pod, notched at the top (Fig. XLIV., 4). A very pretty relative of this plant is the American brooklime, *Veronica americana*, which often recalls the forget-me-not, growing by the brook side and about springs. Several other species of veronica are common in Canada, the majority, like the thyme-leaved speedwell, having a striped corolla in which fanciful minds have seen a resemblance to St. Veronica's handkerchief.

Although plants of ordinary type are most characteristic, Canada is not without her curiosities. The pitcher-plant, *Sarracenia purpurea*, so common in peat bogs and tamarack swamps, is found from Labrador to the Rockies. This strange plant bears a cluster of hollow leaves close to the ground; these are reddish without, pale green within, and veined with a rich crimson, thus forming a pleasing contrast to the

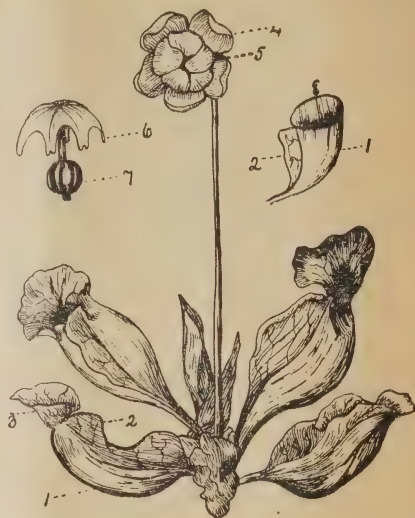


FIG. XLV.—PITCHER PLANT.

pale moss amongst which they grow. The dull purple flowers are quite as interesting as the leaves, suggesting by their form the name side-saddle flower. Each blossom nods from the top of a tall scape, a foot or more in height. The five sepals (Fig. XLV., 4) and five petals (Fig. XLV., 5) are similar in colouring, but the latter are incurved over the stigmas. The pistil has a five celled ovary (Fig. XLV., 7) and the short style expands at the top into a five-rayed umbrella, under the angles of which are the small hooked stigmas (Fig. VII. 6). To return to the leaves, each is a curved, ascending body (Fig. XLV., 1), hollow and furnished with a broad wing (Fig. XLV., 8). At the top is an erect expansion or hood (Fig. XLV. 3), which never closes the pitcher. The bright leaves attract unwary insects, enticing them to a watery grave. If a fly crawls over the slippery edge of the pitcher it becomes lost in the thicket of bristly hairs which point downwards, preventing any return when the journey has been begun. The victim finally drops into the water with which the pitcher is half filled, and there its body decays and dissolves, probably acted upon by a digestive substance in the water. The solution is then absorbed by the plant, supplementing the insufficient amount of nitrogen it obtains from the poor soil. Thus the side-saddle flower is an excel-

lent example of "carnivorous plants," many species of which, belonging to various families, abound in different parts of the world.

VIII.

JUNE ORCHIDS.

What a world of mystery has long been suggested by the very name, orchid! Dreams of tropical forests, where beauty and danger lurk together, come with the thought of these flowers. Haunted by such visions of glorious beauty and of strange forms, it is often a surprise to learn that sixty species of orchids have been found growing wild in Canada. Many are inconspicuous, but some glow with rich hues and charm by grace of line. Dwelling far from the haunts of men, they are generally unsought and unseen. But explorers of our native wilds are rewarded not only by the peculiar delight of finding rare and beautiful specimens, but they are introduced to most fascinating puzzles, solved only after patient waiting. For there are amongst the orchids no chance grotesques, no incomprehensible variations; each eccentricity of form, each coloured line, each mechanical device has a purpose which can be understood when the flower is studied with its insect friends. So exclusive have these floral aristocrats become, that in many cases hospitality is denied to all but one class of visitors, and the door is firmly barred against uninvited guests.

A careful examination of one will give a clue to the secrets of all. Therefore, the showy orchis, *Orchis spectabilis*, will be discussed as a type. Throughout Eastern Canada, it springs "deep hidden in the damp recesses of the leafy woods." Low, rich maple and beech groves are its favourite haunts, but it is nowhere abundant. Epiphytic orchids, that is those which absorb all their nourishment from the air, must be sought in warmer countries; and, like other Canadian species, the showy orchis is prosaically rooted in the soil. From a mass of fibrous roots, a very short stem arises, bearing two large shining leaves (Fig. XLVI., 1). From between them springs a scape, terminating in a loose cluster of flowers, each of which is furnished with a dark-green, pointed bract. The irregular flower (Fig. XLVI., 2) has a one-celled ovary, from the top of which the sepals and petals seem to arise. This appearance is due to the fact that the base of the perianth is closely



FIG. XLVI.—SHOWY ORCHIS.

attached to the ovary, and only the upper portion is free. The sepals are petal-like, and coloured, and one of the petals, which differs from the others in form and position, is called the lip and acts as a platform upon which insects alight. In the centre of the flower stands the column, composed of a single stamen closely united with the style and stigma.

The lip of the showy orchis is pellucid, white, and wavy in outline, while the other petals and the sepals are slightly united in a pinkish-purple hood, which over-arches the column (Fig. XLVI., 2). The lip turns down and is continued in a long spur-like nectary, the opening to which is just below the column (Fig. XLVII.). The flower, as Gibson has shown, is adapted especially to the visits of bees. The anther-sacs of the stamen are slightly separated and parallel. Each is filled with a mass of pollen, the grains of which are united by a cobwebby elastic substance into a large, club-shaped body, called a pol-

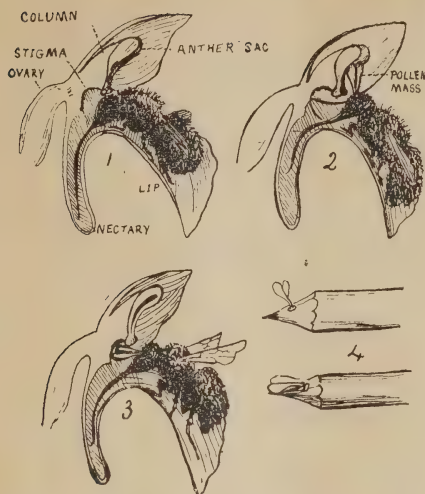


FIG. XLVII.—SHOWY ORCHIS—POL-
LINATION.

linium. (Fig. XLVI., 3.) Each pollen-mass is borne on a slender stalk, which ends in a sticky disc. The discs of the two pollinia fit into a little socket, covered by a delicate membrane, and just below them is the broad stigma. When a hungry bee approaches the flower he alights on the lip, and thrusts his proboscis down the nectary, (Fig. XLVII., 1). In his eagerness, he brings his head violently against the membrane, which protects the pollen discs, rupturing it. The sticky discs then cling closely to the face or head of the bee, and he finally flies away bearing the pollinia with him. (Fig. XLVII. 2). In about the length of time it takes to fly from one flower to another, the pollen masses droop; and, as the bee enters the next flower, they are thrust against the stigma to which the pollen clings (Fig. XLVII. 3). The withdrawal and movement of the pollinia may be demonstrated easily by placing a pointed pencil into the opening of the spur and immediately removing it (Fig. XLVII., 4). Shortly after pollination the flower withers and the ovary becomes a pod filled with an enormous number of tiny seeds resembling fine sawdust in appearance. Few orchids produce less than 6,000 seeds in each pod, and Muller found 1,756,440 seeds in a single pod of *Maxillaria*. But orchids are so highly specialized that

they rarely find that combination of circumstances which is favourable to survival; and notwithstanding the multiplicity of seeds, plants are never very abundant. The showy orchis blooms in May and June, while the closely allied *Orchis rotundifolia*, which is found in peat-bogs as far west as the Rocky Mountains, flowers in June and July. The latter plant has only one leaf at the base, and the three-lobed, white lip is spotted with purple.

While some assert that the showy orchis is the earliest representative of the family, others assign this honour to *Calypso borealis*. (Fig. XLVIII.) From the Atlantic to the Pacific, it grows in cool bogs and damp woods, burying its bulbs and coral-like roots deep in moss. The bulb gives rise to one glossy, dark green leaf (Fig. XLVIII., 2), and a short scape bearing a single pendulous flower (Fig. XLVIII., 1). The grace-



FIG. XLVIII.—CALYPSO.

ful, sweet-scented blossom has narrow, twisted, pale-pink sepals and petals, and a large saccate lip, two-parted and bearded with yellow and pink. So exquisite is the flower that its discoverers felt that it was akin to the divine, and named it after an immortal.

Similarly, the most beautiful genus amongst our native orchids is dedicated to the use of the fairest of ancient goddesses. *Cypripedium* may be interpreted Venus's slipper, but the plant is commonly called lady's slipper or moccasin flower. In May and June, the stemless lady's slipper, *Cypripedium acaule*, is comparatively abundant in swamps, especially under hemlocks and pines, from the eastern shores of the Dominion to the Mackenzie River. It has

two large oval leaves (Fig. XLIX., 1) lying close to the moss, amidst which the plant grows, and a scape bearing one large flower (Fig. XLIX., 2). In all the cypripediums, the lip is swollen and sac-like, forming a nectary. The column differs materially from that of other orchids; the single anther, usually present, is sterile in the lady's slipper, forming a flap which overhangs the stigma (Fig. XLIX., 3), while two fertile anthers, suppressed in other genera, are attached to the underside of the column (Fig. XLIX., 4). The lip

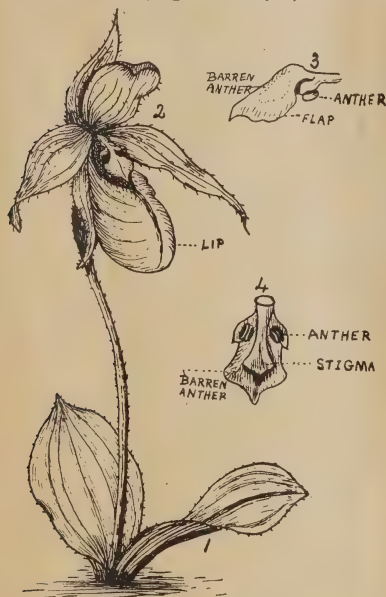


FIG. XLIX.—STEMLESS LADY'S SLIPPER.

of the stemless lady's slipper is unusually large and inflated, and is cleft by a fissure which extends the length of its face. It is an exquisite rose-colour, veined with wavy lines of a deeper shade, but the rest of the flower is purplish brown or green. If a bee enters the pouch through the cleft, it first sucks the nectar, then turning about it crawls out at the opening beneath the column. In doing so, it first comes in contact with the stigma, and then with the anthers, which deposit loose, powdery pollen on the insect's back. Repeating the process at another flower, the bee again in escaping

meets with the stigma before the anthers. The former, instead of being smooth and sticky, is beset with little, stiff, pointed projections which point backwards and form an effective brush for removing pollen from an insect as it passes. Thus cross-pollination is ensured and self-pollination is rendered impossible.

Six other species of cypripedium have been observed in Canada. The handsomest of all is the showy lady's slipper, *Cypripedium spectabile*, which is often found in peat-bogs and tamarac swamps from Nova Scotia to Georgian Bay. It has several ovate leaves, and the flower displays a large rosy-pink striped lip and whitish petals and sepals. Two yellow lady's slippers blossom from May to July. The smaller *Cypripedium parviflorum*, bears "golden slippers meet for fairies' feet." It often occurs in swamps in Ontario, and is found as far west as the Rocky Mountains. The fragrant, graceful flower has a deep-yellow sac and reddish-brown sepals and petals. The larger yellow lady's slipper, *Cypripedium pubescens*, has a pale-gold lip, sometimes striped or spotted with "rubies, fairy favours," and the narrow petals and sepals are of pale fawn colour veined with deeper shade. Though never common, the interesting ram's-head lady's slipper, *Cypripedium arietinum*, is sometimes found in Quebec, Ontario and Manitoba, occurring on hummocks in cedar and tamarac swamps. Though occasionally found in May and June, it is at its best in July. It bears three or four leaves at the base of a low stem, and a solitary drooping flower. The small purplish blossom has a fancied resemblance to a ram's head with projecting horns and ears and a tuft of wool at the top.

Blossoming about the same time as the stemless lady's slipper, the "elusive nymph," *Arethusa bulbosa*, displays large rose-purple flowers (Fig. L., 1, 2) in the peat-bogs of eastern Canada. This low herb has one grass-like leaf, which sheaths the scape, and a solitary, terminal flower. The column (Fig. L., 3) is especially interesting. It is forked at the tip and the anther is closely fitted in the angle and hinged to the upper projection, hiding the pollen-mass behind it. When an insect steps upon the threshold and puts his head in at the opening of the shallow nectary, he pushes the anther more closely into its place; but, when he withdraws, the tip of the anther catches on his back, swings out, and smears him with the golden pollen mass. Then, winging his way to another flower, as he enters, his back comes in con-

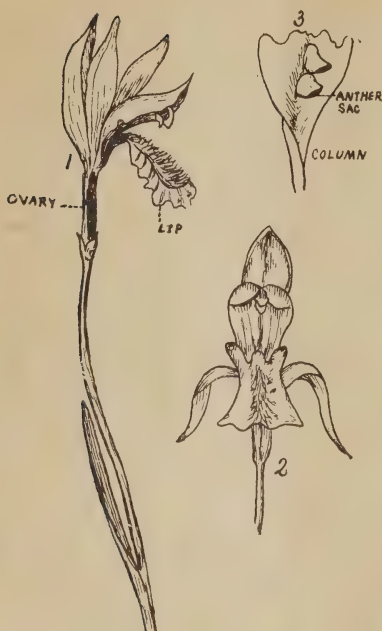


FIG. L.—ARETHUSA.

tact with the stigma, which is on the under side of the forking column, and so he leaves his burden behind him and gathers a new one as he departs.

Sweet pogonia, *Pogonia ophioglossoides*, is another rare beauty, well worth pursuit. Its rosy blossoms (Fig. LI. 1) glow from the peat-bogs of Newfoundland and are found as far west as Parry Sound. The perfume, sug-

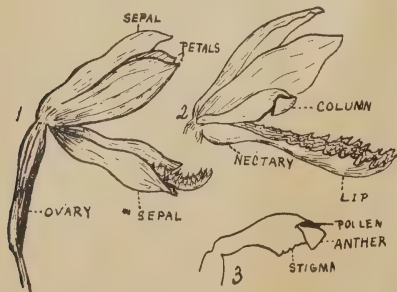


FIG. LI.—SWEET POGONIA.

gesting ripe red raspberries, is wafted across the hedges, inviting insects to alight on the outstretched, fringed lip, where they are given a welcome very similar to the greeting which *Arethusa* extends to its guests. The stem of *pogonia*, which is about eight inches tall, bears a single ovate or lance-shaped leaf near the middle and a solitary terminal flower. The form and arrangement of the organs will be understood from a glance at the accompanying drawings of a flower (Fig. LI., 2) with one petal and one sepal removed so as to show the column, and of the column detached from the other organs. (Fig. LI., 3.)

The lovely *Calopogon pulchellus* has the same range as *pogonia*, and generally occurs with it. This orchid differs from the others in not having a twisted ovary, thus the lip appears to be on the upper side of the flower. The scape, which springs from a small, solid bulb, is sheathed at the base with a grass-like leaf (Fig. LII., 1), and bears from four to eight rose or lilac-coloured flowers in a loose cluster (Fig. LII., 2).



FIG. LII. — CALOPOGON OR GRASS PINK.

The lip is exquisitely bearded with white, yellow and purple hairs, giving the plant its name, which means "beautiful beard." The sepals and other petals are of a bright reddish-purple colour, and very fragrant.

Several other orchids may be sought in June, though no others are as beautiful and conspicuous as those described. But enough has been said of the wonders of these plants, the flowers of which, "through long eras of adaptation" have gradually shaped themselves to the forms of certain chosen insect sponsors, looking to more certain perpetuation.

IX.

THE EARLY SUMMER.

June and roses seem inseparable, but few appreciate an "unloved relative of the exquisite wild-rose." Nevertheless, the magenta blossoms of the purple-flowering raspberry, *Rubus odoratus*, is found in green foliage are both showy and attractive. The purple-flowering or Virginia raspberry, *Robus odoratus*, is found in rocky woods and shady fence corners from Nova Scotia to Lake Superior, blossoming from June to August. It resembles its celebrated cousin, the common wild-rose, in the general appearance of the flower (Fig. LIII., 2), but is more closely allied to the edible raspberries and blackberries. The large leaves (Fig. LIII., 1), of this shrubby bristly plant are most characteristic. They are toothed and three or five-lobed, the middle division being the largest and very



FIG. LIII.—PURPLE-FLOWERING RASPBERRY.

pointed. Terminating the branches are loose clusters of large flowers, which are a bright purplish red in the shade, but fade to a pale bluish-pink in the sun. Covered, like the stems with sticky bristly hairs, the calyx is composed of five long slender sepals united at their bases. The rounded petals are five in number, but the yellow stamens and the pistils are very numerous. Though capable of self-pollination, cross-pollination is often effected by bumblebees and other insects seeking the nectar secreted between the bases of the filaments and the receptacle. The fruit resembles an ordinary raspberry, but is flat, broad, and not very edible.

A humble representative of another large family is abundant from June to September. *Brunella vulgaris*, sometimes called *Prunella* (Fig. LIV.) rejoices in several common



FIG. LIV.—SELF-HEAL.

names; a few, such as self-heal and heal-all, refer to the reputed medicinal virtues of the plant, but "blue curls," describes the appearance of the flower. Whatever its properties, brunella deserves renown, for it has succeeded in adapting itself to most varied surroundings in three continents. Several forms occur from the Atlantic to the Pacific; Macoun thinks there may be two varieties in the east, one of which may have been introduced, but he regards the western form as undoubtedly indigenous. In pastures and by dusty roadsides, self-heal is a low, stunted plant; but in wet woods and by streams, it reaches a height of two feet and bears large bright clusters of flowers. Like other members of the mint family, it is distinguished by a square stem, opposite leaves

and a two-lipped corolla, as well as by the form of the pistil and the number of the stamens. The oblong or ovate leaves may be entire or toothed, hairy or smooth, but they are generally of a somewhat rusty green colour. Little clusters of small flowers are arranged in a close terminal spike about one inch in length. Both calyx and corolla are two-lipped; the former is quite short and closes over the fruit, the latter is contracted near the base of the lips and dilated immediately below. The lower lip of the corolla is recurved and divided into three lobes (Fig. LIV. 4); but the upper is entire (Fig. LIV. 3) and arches over the stamens, which are grouped in two pairs, the one longer than the other (Fig. LIV., 5 and 6). Each filament is toothed at the apex, only one division bearing an anther. The slender style terminates in a two-cleft stigma (Fig. LIV., 7) but the ovary is deeply lobed and forms four little nutlets in fruit. Though the purple or pale violet flowers (they are rarely white) are small, the clusters are sufficiently conspicuous to attract several kinds of insects. Bees pause most frequently upon the lower lip. Resting there for a moment, they seek not only the honey concealed in the throat of the flower, but pollen which is dusted upon them from the overarching stamens.

Lubbock says blue is the favourite colour of bees. However, this may be, they reply in great numbers to the invitation of the blue flag, *Iris versicolor*. (Fig. LV. A). The rich violet-blues of the perianth, variegated with green, white, or yellow, and veined with gold and purple, reflect the

magnificence of the rainbow, from which the genus takes its name. The fleur-de-lys, "the flower of chivalry," was chosen by Louis VII., as his badge. But the flower of Louis probably was the white iris, a more regal and ethereal beauty than the blue flag. The perianth of the latter, which is united to the ovary at the base, possesses three recurving outer divisions (Fig. LV., 1), and three smaller erect inner divisions or petals (Fig. LV., 2). The style is divided into three petal-like spreading lips, each bearing a stigma near the tip of the upper surface (Fig. LV., 3), and over-arching a stamen (Fig. LV., 4). This arrangement effectually prevents self-pollination, but bees are unconscious agents, carrying pollen from flower to flower. Lighting upon one of the recurving sepals, the bee, guided by the veining, thrusts his head and back beneath a branch of the style, and sips the honey at the base of the stamens. In withdrawing, he leaves the stigma untouched, but at the next flower he visits, the projecting stigmatic lip scrapes his back, thus gaining the needed pollen. The common blue flag is abundant in ditches, swamps, and along river and lake margins from Newfoundland to Winnipeg; and its more graceful sister, *Iris virginica*, has been found in the salt marshes of the eastern coast. The latter has grass-like leaves; the flowers occur either singly or in pairs on very slender stalks, and the fruit is sharply three-angled.

A closely allied plant blossoming at the same time, is the blue-eyed grass, *Sisyrinchium angustifolium* (Fig. LV., B). Its little blue or purple flowers display their hearts of gold in every meadow on sunny June mornings, but close forever later in the day. They are tantalizing beauties reserving their charms for home and obstinately shutting them from sight as soon as the blossoms are gathered. Unlike the blue flag, the parts of the perianth are regular and spreading and the divisions of the style are thread-like. At least two species occur in Canada, ranging from the Atlantic to the Pacific, and a white variety is found in the west.

Blossoming a little earlier than the blue-eyed grass, the fringed polygala, *Polygala paucifolia* (Fig. LVI.), is most exquisite in form and colouring. It grows on sandy soil and in rich woods, generally beneath the pines of New Brunswick, Quebec, Ontario, and possibly as far west as the Saskatchewan. Its showy, purplish flowers, occasionally varying to pure white, have given it the name "gay wings;" and it is often most inappropriately called "flower-



FIG. LV. — BLUE FLAG AND BLUE-EYED GRASS.



FIG. LVI.—FRINGED POLYGALA.

ing wintergreen." Upright shoots arising from prostrate or underground stems bear small scale-like leaves below (Fig. LVI. 1), a cluster of large leaves above (Fig. LVI. 2), and from one to four flowers at the top, on short stalks (Fig. LVI. 3). Of the five sepals (Fig. LVI. 4), three are small, while two are large and coloured like petals. The three petals (Fig. LVI. 5) are united with each other, and the central one is keel-shaped and delicately fringed at the apex (Fig. LVI. 6). The six stamens, grouped in two sets are united at their bases and enclosed in the keel (Fig. LVI. 7); and the pistil has a two-celled ovary and a slender curved style (Fig. LVI. 8). In addition to these "butterfly blooms" the plant possesses other small flowers or underground branches. These produce numerous seeds, causing Gibson to say that the polygala has "one playful flower for the world, another for serious use and posterity." It is probable that the showy blossoms prevent the degeneracy apt to follow incessant self-pollination, while the closed flowers guard against the dying out of the species in cases where visits from bumblebees are infrequent. Five other species of polygala have been reported as occurring in eastern Canada, the prettiest of which is the racemed milkwort, *Polygala polygama*. It has small purplish-pink flowers clustered at the upper part of a leafy stem, and others, which never open, are borne on underground branches.

Equally interesting in its habits is the sheep-laurel, *Kalmia angustifolia* (Fig. LVII). This beautiful low shrub is very abundant either in boggy or in rocky

places in the Maritime Provinces, and it extends westward to Georgian Bay. Its evergreen leaves, which are generally opposite or in groups of three (Fig. LVII., 1), are pale beneath and light green above. The flat flower-clusters are borne on the sides of the stem below the leafy shoots of the season (Fig. LVII., 2). Each blossom has a small five-toothed calyx and a rosy corolla which is wheel-shaped and five-lobed. The latter is supplied with



FIG. LVII.—SHEEP LAUREL OR LAMB-KILL.

ten depressions or pouches in which the anthers of the arching stamens are lodged (Fig. LVII., 3). When an insect visits the flower, a mere touch at the centre sets the stamen free from the pockets, and causes them to curve quickly back dusting the visitor with a "sulphur-shower" poured from tiny openings at the tips of the anthers (Fig. LVII., 4). The plant gives violent welcome to insect visitors, but its common names tell us that others suffer still more. Sheep-laurel, lamb-kill and calf-kill all bear witness to its supposed deadly character, which leads farmers to uproot it from pastures in spite of the admiration bestowed upon its charming crimson-pink flowers which make it one of the glories of June.

X.

"THE HIGH-TIDE OF THE YEAR."

Daisies run riot by the wayside and glorify neglected farms; buttercups catch the sun in golden chalices; roses unfold pale pink blossoms in thicket and old field; and, from pasture and meadow, sweet breezes bear the breath of clover. The hum of happy bees says that, for them too, no day is so rare as one in June. Few realize how close the connection is between red clover and bumblebees, until they hear of the disappointment of Australian farmers over magnificent fields of clover, which obstinately refused to set seed until their insect partners were also imported. Children as well as bees have sucked the hidden sweets, but few have noticed that the little flowers of which each clover head is composed, are like miniature pea-blossoms, and fewer still have paid the plants evening visits when the leaflets droop and are folded in sleep. White, pink, and yellow clovers are all familiar, and the lovely crimson clover with long brilliant heads has been sparingly introduced into Canada. The commonest species are the so-called red clover, *Trifolium pratense*, which has everywhere escaped from cultivation, and the white clover, *Trifolium repens*, of pasture and meadow, which is probably a native of the

northern part of America. The sweet clovers belong to a closely related genus, and both the white and the yellow species, *Melilotus alba* and *M. officinalis*, frequent roadsides near old gardens. Both leaves and flowers have a peculiar perfume and the latter are dearly loved by bees. The upright plants, from two to four feet in height, display slender spikes of small flowers throughout the summer.

Many other members of the pea-family flourish in Canada. The American vetch, *Vicia americana*, with slender clusters of bluish-purple blossoms, trails its way with the help of tendrils, which terminate the compound leaves, from Niagara to the Pacific coast. The common vetch, *Vicia sativa*, has been widely spread through the agency of railways; and, though it has escaped from cultivation, it is more frequently found along railway embankments than in cultivated fields. A characteristic member of the family is the beach or everlasting pea, *Lathyrus maritimus* (Fig. LVIII.), which is common along the eastern and western coasts and the shores of the Great Lakes. This stout perennial grows in clumps one or more feet in height, close to the water's edge. The plants are well covered with compound leaves (Fig. LVIII., 1), each composed of from three to five pairs of leaflets and furnished with two broad stipules. The terminal leaflet has been replaced by a tendril. Clusters of purple flowers (Fig. LVIII., 3) spring from the axils of the leaves. Each blossom has a calyx of five sepals united at the base, and five irregular petals, the corolla bearing a slight resemblance to a butterfly. The upper petal or standard is larger than the others and encloses them in the bud (Fig. LVIII., 4); the side petals are called wings (Fig. LVIII., 5) and the two lower are united along one edge, forming a keel (Fig. LVIII., 6), which encloses the stamens and pistil. Ten stamens are arranged in two groups, nine united into a tube which encloses the pistil and one standing alone. (Fig. LVIII., 7.) The pistil has a one-celled ovary, which ripens into a pod, and the curved flattened style is hairy on the inner side. The method of pollination is similar to that of the beach-pea and of the vetches. When a bee alights upon the keel, it is lowered by his weight, and the hairy style brushes the pollen which has collected in the keel out upon the insect's body. Flying away to another flower the bee first comes in contact with the terminal stigma, and later he receives a second dusting. The pea-family exhibits various interesting contrivances to ensure



FIG. LVIII.—BEACH PEA.

cross-pollination and many curious adaptations to environment, besides the "sleep-movements" already noticed.

Such peculiarities are, however, common to many groups. For example the leaflets



FIG. LIX.—COMMON WOOD-SORREL.

of the common wood-sorrel, *Oxalis acetosella*, fold themselves like an umbrella at sunset (Fig. LIX., 1 and 2) and by a reduction in surface-exposure prevent too great a loss of heat by radiation. From Nova Scotia to the Lake of the Woods and on the Saskatchewan, this delicate plant is found in the depths of cool woods. The creeping underground stem sends up a number of clover-like leaves, each heart-shaped leaflet being joined by its smaller end to the leaf-stalk. The flowers (Fig. LIX., 3) are borne singly at the top of slender scapes from two to five inches high. The blossom has five green sepals and five petals; the latter are about half an inch in length and are either white or faint pink veined with a deeper rose. Five long and five short stamens united at their base (Fig. LIX., 4) encircle the pistil with its five-celled ovary and five styles (Fig. LIX., 5). Like the fringed polygala and blue violet, the wood-sorrel produces other flowers which never open. They are not, however, concealed beneath the surface of the ground, but nod from the top of curving scapes at the base of the plant. The name "oxalis" is derived from the Greek for sour, and "acetosella" means salts of vinegar; so, too, the presence of oxalic acid in the juices of the plant has given rise to common names such as sour trefoil and sorrel. "Cuckoo meat" and "cuckoo bread" are English names for the flower because it comes with the cuckoo; and "alleluia" recognizes its advent near the glad Easter season.

The wood-sorrel is claimed by many as the shamrock, which legend says St. Patrick used in illustrating the doctrine of the Trinity. Certainly its tripe leaf was a favourite with early painters, both Botticelli and Fra Angelico often using it in the foregrounds of their pictures. The yellow wood-sorrel or Lady's sorrel, *Oxalis stricta* is a much commoner plant, growing in waste or cultivated ground, along river margins, or by the roadsides, from Nova Scotia to Manitoba. It has an erect leafy stem, and yellow flowers occasionally marked with red at the base of the petals. Though in the form of the blossom it resembles the common wood-sorrel, it is much more variable and blooms the summer through.

Many insignificant plants have conquered in the struggle for existence, while larger more attractive forms have failed. Excellent instances of the former are furnished by the pink family. Although it was introduced from Europe, the common chickweed, *Stellaria media*, has a wider range than many indigenous species. From the Atlantic to the Pacific, it has become an obnoxious and omnipresent weed. Its weak stems with ovate leaves bear tiny white flowers the summer through; but a native species, the long-leaved stichwort, *Stellaria longifolia* (Fig. LX.), blossoms



FIG. LX—LONG-LEAVED CHICKWEED

only from May to July. The latter is essentially a northern form, frequenting the grassy margins of woodland brooks from the east to the west coast. Its weak but erect stem is furnished with pairs of long slender leaves, narrowed at both ends and spreading (Fig. LX). The branches terminate in flat, loose, spreading clusters of small flowers (Fig. LX., 1). Each has, as a rule, five sepals, five deeply-cleft, white petals (Fig. LX., 2), ten stamens (Fig. LX., 3), and a pistil with three styles but a one-celled ovary, in which the seeds are attached to a central column (Fig. LX., 4). The long-stalked stichwort, *Stellaria longipes*, has similar eastern and western limits, but it extends as far north as the Arctic sea. It is smooth instead of rough-stemmed and has ascending not spreading leaves and flower-stalks. The northern stichwort, *Stellaria borealis*, also extends from the Atlantic to the Pacific coast, frequenting open swamps and the muddy margins of brooks. It has broader leaves than the long-leaved stichwort, and the petals are very short or wanting.

While the chickweeds are unpretentious cousins of the pinks, more showy relatives grow wild in Canada. One of the largest and more interesting forms is the night-flowering catchfly, *Silene noctiflora*, (Fig.



FIG. LXI.—BOUNCING BET AND CATCH-FLY.

Saponaria officinalis (Fig. LXI., 1), displays her white or pale pink flowers during the day, they are much more attractive at night, when their pale colour and strong perfume signal to the sphinx moth. As in most catchflies, self-pollination is prevented by the stamens maturing before the pistil. First, the five outer stamens protrude and shed their pollen, the five inner stamens dehisce next, and finally the styles push forward and open out their stigmatic surfaces to catch the pollen brought by moths from younger flowers.

Another nocturnal beauty is the common evening primrose, *Oenothera biennis* (Fig. LXII.). Faded and dull during the day at the approach of evening it slowly unfolds a fresh bud and emits a sweet perfume. In one form or another, this plant extends from



FIG. LXII.—EVENING PRIMROSE.

the east to the west coasts of Canada. In structure, the flower resembles the familiar fuchsia. The very long, slender calyx tube (Fig. LXII., 5) is attached at its base to the four-celled ovary, and encircles the thread-like style. At the top, the tube expands into four reflexed lobes (Fig. LXII., 1), and to it are attached four large, spreading, yellow petals (Fig. LXII., 2) and eight stamens with long anthers (Fig. LXII., 3). The style is crowned by four linear stigmas. The plant itself is erect and branching, growing from two to five feet high, and furnished with

LXI., 2), which opens its pinkish or white flowers in the twilight. Then breathing forth a sweet odour, it invites moths to call upon its pale blossoms which gleam through the dusk. As a protection against smaller, useless visitors, the stem and calyx are beset with sticky hairs which catch ants and other thieves before they reach the store of honey. Though Bouncing Bet,

an abundance of entire, lance-shaped, sessile leaves. The beauty of the flower endures only for a night, but its conquests are many. Moths, large and small, eagerly sip the nectar secreted at the base of the calyx tube; a lovely little pink moth with yellow markings on its wings is a frequent caller, receiving at each visit a golden necklet of pollen. In the morning, the corolla usually drops from the top of the ovary; but, if by any chance its work is not accomplished, it remains fresh for a few hours longer, in the hope of attracting bumble-bees and humming-birds. Later in the season it is said to change its habits and to keep open all day long. Anomalous as it may seem, there are several day-blooming evening primroses. A small species, *Oenothera pumila*, flourishes in dry sandy soil, and on river banks from New Brunswick to the Lake of the Woods. Sundrops, *Oenothera fruticosa*, has also been reported as occurring near Halifax and Montreal. It is a tall, stout form with a strongly winged seed-vessel. As it unfolds its flowers during the day, its visitors are generally bumble-bees, but the little white cabbage butterfly also sucks the honey, and several beetles, wasps and small flies seek the pollen which is so abundantly produced.

XI.

BENEATH THE JULY SUN.

Although the sweet smell of new mown hay suggests the passing of the flowers, summer's flaunting beauties are only beginning to appear, and many of the blossoms of early July have the delicacy and faint tints associated with the spring. Along the roadsides and in thickets, the wild clematis, *Clematis Virginiana* (Fig. LXIII.), is beginning to drape fence and shrub with fleecy clusters of white flowers. From July to September it so adorns the roadside as to well deserve the name of "Traveller's Joy." Later in the autumn, its charming feathery fruit-clusters form silvery masses (Fig. LXIII., 6) which have given rise to another folk-name, "old man's beard." The plant is an exquisite perennial vine with a slightly woody stem. It climbs from shrub to shrub by means of its sensitive leaf stalks, which act as tendrils, bending about an object when irritated by contact with it. The opposite compound leaves are composed of three pointed, toothed leaflets, more or less cut or lobed (Fig. LXIII., 1). The small

flowers, which are arranged in flat clusters (Fig. LXIII., 2), are of two kinds, borne on separate plants. Both have four or five greenish-white sepals and are destitute of petals. The staminate have no pistils, but a large number of stamens with short, blunt anthers (Fig. LXIII., 3); while the pistillate flowers possess many separate carpels (Fig. LXIII., 4), but no stamens. The fruits are small one-seeded bodies, each bearing a persistent style which has become a long, plummy float for the tiny seed-vessel (Fig. LXIII., 5). The clematis is a member of the crowfoot family, but it blooms later than most of its immediate relatives and thus avoids competition



FIG. LXIII.—CLEMATIS OR VIRGIN'S BOWER.

with them. Its white sepals make it most conspicuous in shady nooks, attracting great numbers of flies and other small insects, which effect cross-pollination. The Virginia Clematis is especially common along streams and in low grounds from Nova Scotia to Lake Winnipeg. Earlier in the season, *Clematis verticillaris* stars rocks and bushes from Quebec to British Columbia. Its flow-

er stems are crowned with bluish-purple blossoms, each from two to three inches in diameter. Another species, *Clematis Douglasii*, which has been found in the southern parts of British Columbia, has a nodding purple flower about one inch in length, at the tip of the flower stalk, and the plumes of the seed-vessels are brownish in tint. Neither of these forms is as beautiful as the common clematis.

The lovely twin-flower, *Linnaea borealis*, has no legend attached to it, but its associations appeal strongly to all naturalists. The immortal Linnaeus

"Saw beneath dim aisles in odorless beds
The slight *Linnaea* hang its twin-born
heads."

and allowed Gronovius to name this little plant for the master who first described it. Trailing over the cool moss of northern woods, it carpets logs and rocks from the Atlantic to the Pacific with its small, round, evergreen leaves (Fig. LXIV., 1). Borne aloft on slender stalks, pairs of rosy bells nod above the green foliage (Fig. LXIV., 2). Though the plant seems so unlike the honeysuckles, the structure of the flowers proves it to be a member of the same family. The calyx-teeth are five in number, and sticky; the corolla is bell-shaped, and purplish-pink, or white, tinged with rose; four stamens, two short and two long, are attached to the corolla, and a single slender style springs from the three-celled ovary. Only one seed matures, the ovules of two ovary-cells being small and abortive. (Fig. LXIV., 3.) The flowers show interesting adaptations to various foes, especially to tiny marauders, whose path to the store of honey is impeded by the hairs which line the corolla tube, and the bells nod so as to protect



FIG. LXIV.—TWIN-FLOWER.

their treasures from the rain. Lest insects suited to the flower's needs should miss their way, fine dark lines upon the corolla point to the nectary, and its position is indicated by a dash of orange.

In July, insect-life seems most abundant, and the orchids closely associated with them are well represented. One of the most interesting is the rattlesnake plantain, *Goodyera pubescens*. Darwin tells us that it "probably shows us the state of organs in a group of orchids now mostly extinct, but the parents of many living descendants." The most conspicuous feature of the plant is not the flower but the leaf. Forming a rosette close to the ground (Fig. LXV., 1), the leaves arise from a fleshy, creeping rhizome. Silky in texture, with wavy edges and of a dark grayish-green hue, they are beautifully veined with white. From their midst springs a stem bearing a many-sided spike of creamy flowers, the oldest at the base, the youngest at the top (Fig. LXV., 2). Each blossom (Fig. LXV., 3), has a globular lip, like an inflated sac, in which nectar is secreted. The anther is short and attached to the back of the column (Fig. LXV., 4) by a small stalk. The two pairs of pollen-masses are united at their bases to one disc, which is protected by a moist membrane and lies at the top of the stigma. In the young flowers, the broad stigma is concealed and inclines inwards. When a bee approaches the column of a young flower, it ruptures the membrane covering the pollen-disc, and the latter adheres to his tongue. Flying away he



FIG. LXV.—RATTLESNAKE PLANTAIN

withdraws the pollinia, and visiting another spike he begins to suck at the older blossoms first. In these, the lip has become lowered and the column has so changed its position as to bring the stigma into a position where it must receive pollen from its visitor. The species described, though somewhat rare, is found in the dry woods of Newfoundland, the Maritime Provinces, Quebec, and Ontario. The lesser rattlesnake plantain, *Goodyera repens*, is much more abundant, occurring in mossy woods, especially under evergreens, throughout the breadth of the land. It is characterized by its greenish white flowers arranged in a one-sided spike, and by the form of the lip which is supplied with a longer recurved tip than that of the other species. It has been said that Indians used the leaves of this plant as a cure for the bite of the rattlesnake, but it is probable that the markings of the leaves and not their reputed virtues gave rise to the popular name.

Not only is the derivation of many folk-names uncertain, but much confusion has arisen from the application of the same name to different plants. Thus in some localities the aromatic, creeping winter-green, *Gaultheria procumbens*, has been called "partridge-berry," though the latter title properly belongs to *Mitchella repens* (Fig. LXVI.) A worthy successor of the trailing arbutus and a fit companion to the twin-flower, the partridge-berry creeps at the roots of trees from Nova Scotia to



FIG. LXVI.—PARTRIDGE VINE.

Georgian Bay. This evergreen vine is clothed with dark, shining leaves, often veined with white (Fig. LXVI., 1). From this exquisite setting, the cream-white flowers gleam in June and July, succeeded later by glowing coral-red fruit. The blossoms oc-

cur in pairs, the ovaries of the two flowers being closely united (Fig. LXVI., 2). Calyx and corolla are both four-lobed; the latter is funnel-shaped with a spreading border, densely bearded within, and either entirely white or tipped with rose. There are four stamens and the single style has four narrow stigmas. The ovaries form one berry-like fruit, crowned with "two eyes," which are the remains of the calyx-teeth of the twin-flowers (Fig. LXVI., 3). Though nearly tasteless, the fruits are much appreciated by birds, but many escape and decorate the vines the following spring. Self-pollination is effectually prevented. Certain plants bear flowers with long stamens and short styles, while others produce blossoms with short stamens and long styles. The hairs which line the corolla-tube exclude short-tongued insects from the nectary, but butterflies and many bees have no difficulty in sipping the honey. When visiting a flower with long stamens, the insect receives a deposit of pollen at that point, which will come in contact with the stigmas of a long-styled flower approached later, and thus cross-pollination results. Similarly the form with short stamens is adapted to the pollination of the short-styled blossom. The partridge-berry belongs to the madder family, a familiar example of which is the bed-straw or Galium. Several species of the latter are common in Canada. The majority are slender herbs with square stems, whorls of small leaves and flat clusters of tiny white flowers. The angles of the stem and the seed-pods are generally bristly or furnished with hooked prickles.



FIG. LXVII.—PIPSISSEWA OR PRINCE'S PINE.

A pale, fragile flower, lingering in summer woods, is the pipsissewa, *Chimaphila umbellata*. This dainty fragrant plant is most characteristic of coniferous woods, and it ranges throughout the forest country from New Brunswick to Vancouver. From long creeping underground shoots arise leafy stems from four to ten inches in height. The leaves, which are evergreen and shining, are generally whorled (Fig. LXVII, 1), though often scattered on the lower part of the stem. A terminal cluster of flowers crowns the plant (Fig. LXVII, 2). The waxy, fragrant blossoms are either white or flesh-coloured, and they often have a ring of deep pink about the centre. Each has a five-lobed calyx, and a corolla composed of five, rounded, concave, spreading petals. The ten stamens (Fig. LXVII, 3) possess hairy filaments and two-nornd violet anthers, which open by terminal pores. A very short style is crowned by a broad, disc-shaped stigma; and the fruit is a five-celled, rounded, depressed pod. Pipsissewa is said to be of Indian origin, the name having been given to the plant because of its strengthening properties. However, this may be, the herb is used as a tonic in modern medicine. Notwithstanding the absurdities of the old herbalists, many of their remedies are still in vogue, and their knowledge of the properties of plants was sounder than is generally supposed.



FIG. LXVIII.—WINTERGREEN OR SHIN-LEAF.

Another member of the heath family is the shin-leaf, *Pyrola elliptica*. It is found in rich woods from Nova Scotia to the Saskatchewan and, like pipsissewa, it blossoms in June and July. From running, underground, perennial shoots spring clusters of oval leaves (Fig. LXVIII, 1), which are thin and of a dull, dark-green colour. From the centre of the cluster of leaves arises a scape bearing scaly bracts at its base and a cluster of exquisite drooping flowers at the top. The blossoms, which are very fragrant, waxy, and greenish white, have a five-parted calyx and five concave obtuse petals. The stamens resemble those of pipsissewa, but the anther cells are contracted at one end so as to form a short neck (Fig. LXVIII, 4). A long, curved style protrudes from each bell. The leaves of all the species of *pyrola* persist throughout the winter, in consequence of which the plant is often called "wintergreen," a name more generally applied in America to *Gaultheria procumbens*. The latter has an upright, leafy stem, with nodding waxy flowers in the axils of the leaves.

But all the early July flowers do not make their home in the wood; muddy shore and shallow stream have their share. One of the most decorative of the water plants is the arrow-head, *Sagittaria variabilis*. Forms differing greatly in size and foliage extend across the continent, but are most abundant in the East. The plant was given both its popular and scientific names because of its arrow-shaped leaves (Fig. LXIX, 1), which vary from long, narrow, acute forms to those which are broad



FIG. LXIX.—ARROW-HEAD.

and obtuse. There are two kinds of flowers borne either on the same or on different plants. When occurring in one individual, the unattractive pistillate flowers are in the lower part of the cluster, and the showy staminate flowers are at the top. In the former, numerous pistils form one-seeded fruits (Fig. LXXIX., 4), which are collected in a round head (Fig. LXXIX., 3). The staminate flowers (Fig. LXXIX., 2) are furnished with three sepals, three large white petals, and numerous stamens, which form a golden centre. The arrow-head shows not only perfect adaptation to cross-pollination, but it is so constituted as to flourish under varied conditions. Living either in the water or on marshy land, it has already developed several well-marked varieties, which are probably species in the process of making, forms whose characters will later become fixed.

XII

"MIDSUMMER, ALL AFLAME."

Golden-hearted daisies and "black-eyed susans" have fallen with the grass; purple and violet thistles are filling waste places with unappreciated bloom; the gold-



FIG. LXX.—WILD YELLOW LILY.

en cups of the yellow pond-lily gleam near the reeds; the white water-lily opens its sweet pure cup to the morning light; and

many less familiar flowers are appearing in fields and swamps. The glory of the July meadows throughout eastern Canada is the wild yellow lily, *Lilium canadense* (Fig. LXX.). The tall stem arises from a bulb-like rhizome composed of fleshy white scales. (Fig. LXX., 1). Long, lance-shaped leaves may appear singly, but are generally arranged in distinct whorls of from four to ten leaves (Fig. LXX., 2). At the top of the stem nod graceful bells (Fig. LXX., 3). The six distinct parts of the perianth curve backwards and are yellow or orange red, spotted within by dark reddish brown dots, pathfinders for bees, which seek not only nectar, but the reddish brown pollen with which the six slender anthers are filled. A single club-shaped pistil has a three-lobed stigma and a three-celled ovary with many seeds arranged in two rows in each cavity. A closely allied species bears the most brilliant flower of July, the flaming wood-lily, *Lilium philadelphicum*. Its vivid cups of orange-red or vermilion spotted with brown standing erect upon the stems, gleam among the trees in Ontario, abound on the prairies, and appear in British Columbia.

As the summer advances, more and more yellow flowers are found. In every part of Canada, from July to September, some species of St. John's-Wort displays its yellow petals. In the east, the best known is the common St. John's-Wort, *Hyper-*



FIG. LXXI.—COMMON ST. JOHN'S WORT.

cum perforatum. (Fig. LXXI.) It is not a native plant, but one of those "pernicious old-world weeds," which is almost impossible to exterminate. As Burroughs says, "they have been to school to man for many hundred years, and they have learned to thrive upon him; their struggle for existence has been sharp and protracted." And they have been able to establish themselves easily in new homes. The common St. John's-Wort is a perennial, branching plant, with small, opposite, oblong leaves, more or less covered with dots. The numerous flowers are loosely grouped in terminal clusters, which are leafy and ragged in appearance. Each has a calyx composed of five narrow sepals, and five bright yellow petals, one-third of an inch in length and dotted with black. Numerous stamens are united at their bases in three sets, and the pistil has three spreading styles. As its English name implies, it was formerly associated with St. John's Day. The dew which fell upon the plant on St. John's Eve was supposed to be useful in preserving the eyes from disease; and an ointment made from the herb was said to be so valuable a cure for wounds that the plant was often called "the wonderful herb." In the Netherlands, it was gathered before sunrise as a charm against witches; and, in Germany, it was worn as an amulet, a protection from the evil ones abroad on St. John's Eve. The common St. John's-Wort extends from Nova Scotia to Western Ontario but less common species have a wider range. *Hypericum ellipticum*, a pretty form with unbranched stem and smaller pale yellow petals, is found from Nova Scotia to Lake Winnipeg; and the great St. John's-Wort, *Hypericum ascyron* brightens the banks of streams and low grounds from Quebec to the Saskatchewan. The latter often grows to a height of five feet, the flowers are about two inches in diameter, and the stamens are grouped in five clusters.

Another flower which abounds east of the Saskatchewan River, is the yellow loosestrife, *Lysimachia stricta* Fig. LXXII. From July to September, it produces slender terminal clusters of small flowers, along the brooks and rivers, and in low meadows. The stems are from one to two feet in height, and furnished with an abundance of opposite, dotted leaves (Fig. LXXII., 1). Late in the season, bulblets appear in the axils of the leaves and falling to the ground produce new plants. Both calyx and corolla are from five to six-lobed, and the latter is marked with reddish streaks or dots. As in other members of the prim-



FIG. LXXII.—YELLOW LOOSESTRIFE.

rose family, the stamens stand opposite to the petals, but the dotted filaments are united at their bases and unequal in length (Fig. LXXII., 2). The pistil has a single ovary and one long style (Fig. LXXII., 3). The four-leaved loosestrife, *Lysimachia quadrifolia*, is a rarer form found in New Brunswick and Ontario. The stem bears regular whorls of four leaves, the blossoms are larger than those of the yellow loosestrife, and each yellow star has a dash of brick-red between its points. The generic title was given to the group in honour of King Lysimachus, and means a release from strife. It is said that both it and the common name were assigned to the plant because of a superstition mentioned by Pliny that loosestrife placed upon the yokes of oxen renders the beasts gentle and submissive.

Yellows and reds are not the only colours which dye the flowers of late July; blossoms as delicate in tint as those of May are often seen. "In clouded pink or softer white," the meadow-sweet, *Spiraea salicifolia* (Fig. LXXIII.), covers swamps and low meadows, crowds in the corners of the fences, and outlines the ditches, from the Atlantic Ocean to the Rocky Mountains. Its erect, smooth stems, from two to four feet high, bear oval, saw-toothed, alternate



FIG. LXXIII.—MEADOW SWEET AND LEAF OF HARDHACK.

leaves (Fig. LXXIII., 1) and large terminal clusters of small flowers. Each blossom is similar to that of its cousin, the choke-cherry, but the five-cleft calyx remains after pollination; and the five separate carpels ripen into small, several-seeded pods (Fig. LXXIII., 3). Hardhack or steeple-bush, *Spiraea tomentosa*, which is common in low rich grounds from Nova Scotia to Muskoka, has leaves, densely woolly on the under surface (Fig. LXXIII., 4), and thick clusters of crimson-pink (rarely white) flowers.

The spreading dogbane, *Apocynum androsaemifolium* (Fig. LXXIV.), is more attractive in form and even more delicate in colouring than the meadow-sweet. Some variety of this little shrubby plant is found in every part of Canada, in old fields, along the fences and roadsides, and in the thickets. The stem is from one to four feet in height, with forked, spreading branches, clothed with opposite, ovate leaves on short stalks. (Fig. LXXIV., 1). Terminal clusters of fragrant, bell-shaped flowers droop above the leaves. Each flower is about one-third of an inch long, and of a pale pink hue, veined with a deeper shade. Five sharply pointed sepals are united at their bases, and the corolla has five recurving lobes. Within the tube or corolla are five little triangular



FIG. LXXIV.—SPREADING DOGBANE.

appendages which alternate with the five stamens. The filaments are short, and the arrow-shaped anthers bend closely around the stigma. The pistil is composed of two carpels, separate in so far as the ovaries are concerned, but with the stigmas united into a two-lobed body. At maturity, the ovaries have developed into two pods about four inches long, filled with seeds, which are provided with a tail of long silky hairs.

It is interesting to note that plants belonging to distantly related groups, have solved the same problems in similar ways. Thus, floats of silken hairs are favourite means of ensuring the wider distribution of seed. The fireweed or willow-herb, *Epilobium angustifolium*, (Fig. LXXV.) produces great numbers of seeds with tufts of fluffy white hairs attached to their tips. In the form and arrangement of the floral organs, the fireweed closely resembles the evening primrose and is placed in the same family with it. Its tall, unbranched stems with willow-like leaves (Fig. LXXV., 1), spring up quickly in ground which has been recently burnt over in every part of Canada. Loose spikes of magenta-pink flowers, about one inch in diameter, terminate the stems. In the newly opened flower (Fig. LXXV., 2), a bee finds plenty of ripe pollen, but the stigmas are closed and the style turned downwards and backwards. In an older blossom (Fig. LXXV., 3), he is greeted by an extended style terminating in four expanded stigmas ready to receive his burden of pollen. The fruits are slender curving pods, purple in hue



FIG. LXXV.—FIREWEED OR GREAT WILLOW HERB.

and about three inches in length, filled with the silk-tipped seeds. *Epilobium lineare* is a small species of willow-herb, abundant in marshes and peat-bogs from Labrador to British Columbia. Growing to a height of one or two feet, it has very narrow acute leaves borne on short petioles and small, pale pink or white flowers.

The most familiar of the Canadian plants which produce seeds with floats of hair, is the common milkweed, *Asclepias cornuti* (Fig. LXXXVI). Although it is closely related to the dogbane family, it is placed in a separate group, which exhibits wonderful adaptations to various conditions. The stout stem is filled with a milky juice, which may possibly protect the flowers from the inroads of ants. Kerner found that, as ants crawl up the stem, they cut the delicate surface with their feet, causing the milky juice to flow. He says: "The ants were much impeded in their movements, and in order to rid themselves of the annoyance, drew their feet through their mouths.... Many escaped by getting to the edge of a leaf and dropping to the ground. Others tried this method of escape too late, for the air soon hardened the milky juice into a tough brown substance, and, after this, all

the struggling of the ants to free themselves from the viscid matter was in vain." Large pale leaves, which are arranged in pairs (Fig. LXXXVI. 1) are smooth above and hairy below. Dull, pale, purplish or brownish-pink flowers are borne in large broad clusters (Fig. LXXXVI. 2). The individual blossoms are most interesting in structure (Fig. LXXXVI. 3). Both the calyx and the corolla are deeply five-lobed, and the divisions are turned backwards. Five stamens are united to the base of the corolla, the filaments joined in a tube which encloses the pistil. Attached to the tube of the stamens is a crown composed of five hooded bodies or nectaries, each containing an incurved horn (Fig. LXXXVI. 4). The anthers are adherent to the broad five-sided stigma, and each of the sacs contains a flat, waxy, pear-shaped mass of pollen ending in a slender stalk. As in the orchids, the pollinia are fastened to a disc, one of which is placed at each corner of the stigma between two anthers. To every disc (Fig. LXXXVI. 6), one pollinium from each of the anthers next to it adheres; that is, the pollen mass of the right sac of one anther and that of the left sac of another anther are united to the same disc (Fig. LXXXVI. 8). When an insect visits the flower, in struggling to gain a firm foothold, his foot is caught in one of the discs, and he jerks it away with the pollinia attached and departs dangling the



FIG. LXXXVI.—COMMON MILKWEED.

pair from his leg. On his way to another flower the stalks of the pollen masses move, bringing the latter into such a position that they must come in contact with the stigma of the second flower. After pollination, the two separate ovaries (Fig. LXXVI. 7) develop into rough, warty pods (Fig. LXXVI., 10) packed with flat seeds arranged in close layers. To each seed is attached a long tail of silken down, and when the pod ruptures the seeds quickly spread their sails and float away to pastures new. Colonies are constantly being established, and the common milkweed is found almost everywhere in fields and along the borders of thickets from the eastern shores of Canada to the Saskatchewan River. The swamp milkweed, *Asclepias incarnata*, has almost the same range. It is distinguished by its purplish-red or pink flowers and its lance-shaped leaves. Several other species occur in various localities, all agreeing in the wonderful contrivance which ensure their survival in the struggle for existence.

XIII.

BY AUGUST WAYSIDES.

Even in Virgil's time, men were striving to vanquish spreading succory which choked "the rising field;" but sturdy and unconquered it maintained its position and later travelled to the New World, where it found a most congenial home. Throughout Canada,



FIG. LXXVII.—CHICORY.

it forms tangled masses of stems and branches covering acres of ground, and lining the roadsides. Its turquoise or azure blue flowers "matching the sky," appear in July, but their fullest beauty is attained later, and some blossoms linger with the asters and golden-rods, until October. Chicory, *Cichorium intybus*, is a member of the composite family, closely resembling the golden dandelion in the character of its inflorescence. The whole group has discovered that union is strength, and has combined small inconspicuous flowers in heads which are usually spoken of as the blossoms of the plant, although they are really clusters. The individual flowers (Fig. LXXVII. 2) are amongst the most highly modified known, all the floral organs having become closely united. The calyx is joined to the ovary projecting above it as little scales. The petals are combined and drawn out into a long strap with five teeth at the tip indicating the number of the component parts. Five anthers unite in a ring about the style, though the filaments are separate from one another and joined to the corolla. There is a one-celled ovary and a single style, but two stigmas, which are shut upon one another in a young flower and are open and recurved in an older one. Although the sky-blue heads studding the stems (Fig. LXXVII., 1) are very charming, the general effect of the plant is ragged and less attractive. Large thick roots fasten the plant deep in the soil, and stiff branching stems arise to a height of from one to three feet. The basal leaves are large, deeply cut, and petioled; those above are narrower and partly clasp the stem, the uppermost becoming bract-like bodies (Fig. LXXVII., 3). Two other members of the composite family are commonly found along the dusty highways in August, yarrow with finely cut leaves and dull white blossoms, and elecampane with tall stout stalks, woolly leaves, and large coarse disks of yellow flowers. The former is almost omnipresent, but the latter is common only in Nova Scotia and Ontario.

With these plants are associated the feathery white clusters of the delicate wild carrot and the tall spikes of the common mullein, *Verbascum thapsus*. The mullein is another immigrant from Europe, but it has become so characteristic of the eastern part of Canada and of the United States, that it is sometimes called "the American velvet-plant" in England, where it is cultivated as if it were a comparative rarity. It possesses thick, oblong leaves, some of which form a pale-green velvety rosette near the ground, while others clasp the tall, stout and branched stem (Fig.



FIG. LXXVIII.—COMMON MULLEIN.

LXXVIII., 1). The flowers are closely set in long spikes (Fig. LXXVIII., 2), which look incomplete, because few blossom at a time. But the individual flowers are very pretty. Each is furnished with a five-parted calyx, and a yellow, wheel-shaped corolla, with five rounded lobes almost equal in size. Five stamens are present, two long, with few or no hairs upon the filaments (Fig. LXXVIII., 3). The single pistil has a long style flattened at the tip, and a two-celled ovary in which seeds are attached to a central axis (Fig. LXXVIII., 4). Cross-pollination is generally effected by bees. The longer stamens furnish a resting-place for the bee, which clings to the wool of the shorter filaments, and gathers the pollen of the three upper stamens. In the process, pollen from the two longer anthers is rubbed upon the under surface of the insect in such a position as to touch the stigma of the next

flower upon which the bee alights. The pretty moth-mullein has become naturalized in Ontario. Burroughs says: "Of beautiful weeds quite a list might be made without including any of the so-called wild flowers. A favourite of mine is the little moth-mullein, that blooms along the highway, and about the fields, and may be upon the edge of the lawn." It certainly is a charming plant. The slender stem, with green, smoothish leaves, ends in a loose cluster of yellow or white flowers, marked with purplish brown, and the filaments are thickly united with violet hairs. The mulleins are the least modified of the figwort family, and perhaps may be re-



FIG. LXXIX.—YELLOW TOAD-FLAX.

garded as forming a transition genus, which has retained the almost regular corolla and the five stamens of the remote ancestors of the group.

Much more characteristic of the family is the toad-flax, *Linaria vulgaris*. The plant, which is also called ramsted and butter-and-eggs, has become naturalized, wherever there are settlements, and it is especially common in Nova Scotia. It is one of the prettiest midsummer and au-

tum flowers, occurring by the wayside, near gardens, and in waste fields. The sterile stems are very attractive, being tall, slender, and abundantly supplied with narrow, pale bluish-green leaves, covered with a delicate white bloom (Fig. LXXIX., 1). Pale yellow and orange flowers form dense terminal clusters (Fig. LXXIX., 2). The corolla is irregular, with a long spur on the underside (Fig. LXXIX., 4), an erect, two-lobed upper lip, and a three-lobed, spreading lower lip. An orange coloured projection from the lower lip closing the "throat" of the flower is called the "palate." One of the original stamens has been suppressed, only four, two long and two short, being present (Fig. LXXIX., 5 and 6). The pistil resembles that of the mullein (Fig. LXXIX., 7 and 8), but the ripe seed-pod opens near the summit by one or more pores instead of parting into two distinct valves. The velvety orange palate points the way to the nectar in the spur, and guides the bumble-bee in his search. As he alights upon the lower lip, his weight depresses it and opens the palate. Thrusting his proboscis down the throat of the flower, he is abundantly dusted with pollen from the overarching stamens. As soon as the bee flies away, the gaping mouth springs shut, closing the entrance to undesirable thieves. Macoun has reported that plants have been found near

Ottawa and in Nova Scotia whose flowers possess five spurs instead of one.

The figwort family contains about 2500 species, especially abundant in temperate regions and occurring under varying conditions. A common species in ditches and along brooks from Cape Breton to the Saskatchewan is the monkey-flower, *Mimulus ringens*. At first glance, its square stem, opposite leaves, two-lipped corolla, and four stamens suggest the mint family, but an examination of the pistil reveals its relationship to the figworts and snapdragons. The leaves are oblong or lance-shaped, pointed, toothed, with clasping bases (Fig. LXXX., 1). From July to September, flowers resembling a grinning mask occur singly in the axils of the upper leaves (Fig. LXXX., 2). The blossoms are usually violet-purple, with a yellow palate, but a variety with white flowers is abundant north of Campbellford, Ont. *Mimulus luteus*, with deep yellow blossoms, dotted with brownish-purple, is a variable species found in British Columbia and Alaska. The coast and mountain forms are usually only a few inches high, but specimens found amongst the Cypress Hills are tall and stout.

Growing with the monkey-flower beside streams and in other moist places the jewel-weed or wild balsam displays its graceful flowers. Many have seen a resemblance between the brilliant blossoms suspended from a slender, nodding stalk and a "lady's slipper," while others have called it a "lady's eardrop." Few, however, have noticed a phenomenon, which makes the name "jewel-weed" doubly appropriate. After dewy nights, the drooping leaves sparkle in the early sunlight with diamond drops set at the tips of the leaf-teeth, due to superfluous water exuding from the plant at these points. "Touch-me-not" and "snap-weed" are other folk-names given to the plant, because the seed-pods burst suddenly when touched, hurling the seeds several feet away. The pale touch-me-not, *Impatiens pallida*, is very common in cedar swamps from Gaspe to the Peace River. Its smooth, juicy, branching stems are supplied with alternate, thin, pale leaves, which are toothed and petioled (Fig. LXXXI., 2). Each blossom has a calyx composed of three sepals, the two lateral small and green, the other large and coloured like the corolla, sac-shaped, and prolonged into an incurving spur. There are also three petals, two of which are divided into two dissimilar lobes. Five short stamens, having little scales on the inside of the filaments, are more or



FIG. LXXX.—MONKEY-FLOWER.

less united over the pistils. The ovary is five-celled and the stigma almost sessile. The flowers are pale yellow, often sparingly dotted with brownish-red (Fig. LXXXI. 2). The spotted touch-me-not, which is found throughout Canada, has orange-coloured flowers thickly spotted with reddish-brown, and the spur is more tapering and strongly incurved than that of the other



FIG. LXXXI.—JEWEL-WEED, OR TOUCH-ME-NOT.

species. Though bumble-bees and similar insects visit these flowers the ruby-throated humming bird is the most welcome guest. His slender bill is especially well adapted to the cross-pollination of this flower, for as he hovers above it and thrusts his bill obliquely into the spur, he cannot fail to come in contact with both stigma and anthers. Late in the season, the jewel-weed produces cleistogamous flowers. The floral envelopes never open, but are forced off by the growing pod and carried upward upon its tip.

Though the roadsides and swamps are very rich in August flowers, rocky ravines are not destitute. Clinging to the steep banks of rivers and rooted in shady sandy uplands, the slight harebell, *Campanula rotundifolia*, sways on thread-like stalks.

The slender stems from six inches to three feet high are furnished, near the base, with rounded leaves, which soon wither away (Fig. LXXXII., 2), while above, the leaves are long and narrow (Fig. LXXXII., 1). Bright blue or violet-tinted bells tremble in every breeze (Fig. LXXXII., 3). Both calyx and corolla are



FIG. LXXXII.—HAREBELL.

five-lobed, and the former is united to the ovary. There are five separate stamens, with broad filaments, which are joined to the calyx-tube at the top of the ovary. The pistil has three stigmas and a three-celled ovary, which ripens into an egg-shaped, drooping pod, opening near the base by little clefts. The stamens mature and shed their contents even in the bud, but the pollen is prevented from falling out by hairs upon the upper side of the style. Later the stamens wither and the elongated pistil opens its three stigmas, the under surface of which is sticky, serving to catch the pollen brought by bumblebees

from younger flowers. If neglected by insects, each flower can pollinate itself. In this case, the stigmas recurve until they meet some of the pollen grains still clinging to the style. The harebell is the famous blue-bell of Scotland, but it has made a new home in every part of Canada. Several native species, however, are found in the Dominion. A common form in the far north is the Arctic harebell, *Campanula uniflora*, which is from one to six inches in height, and bears erect, blue flowers. The marsh bellflower, *Campanula aparinoides*, is abundant from Nova Scotia to the North-West Territories. It has a very slender, weak stem, rough with bristles, and bearing small, pale blue or white flowers, which droop in the bud, but later stand erect.

The flowers hitherto described are modified for protective purposes, or to ensure cross pollination, and all are supplied with green colouring matter and industriously work for their living. There are others, however, which have acquired the habit of obtaining their food already prepared, and so have become degenerate. No longer needing the machinery by means of which raw materials are converted into plant foods, they have lost their green colour, and their leaves have been reduced to scales. The dodder, which is a member of the morning glory family, is an excellent example. It is easily recognized by the clinging yellow stems, which twine about grasses and other herbs, and sending suckers into the bark of the host, steal the required nourishment. From July to September it produces clusters of dull white flowers, which, though small, have the characteristics of the flowers of green members of the group. The commonest species in Canada is *Cuscuta Gronovii*, which ranges from New Brunswick to the Lake of the Woods. While such parasitic plants prey upon living organisms, other, called saprophytes, feed upon decaying vegetable or animal matter. Not only the lower plants, but members of some of the most highly developed groups live in this way. A beautiful saprophyte occurs in damp woods east of Manitoba. The well-known Indian-pipe, *Monotropa uniflora*, utilizes the leaf-mould accumulated under trees. Fungi are always found growing in connection with its roots and spread out into the soil; so, it is probable, that the two kinds of plants are associated in a co-operative manner and aid one another in the nutritive processes. The roots of the Indian-pipe form a mass of brittle fibres, from which a cluster of wax-



FIG. LXXXIII.—INDIAN PIPE.

en stems from four to ten inches in height arises. The fleshy, white stems are furnished with small leaf scales (Fig. LXXXIII., 1), and at the top nodes a bell-shaped flower (Fig. LXXXIII., 2). There are from two to four early falling sepals, from four to six petals, from eight to ten tawny, hairy stamens (Fig. LXXXIII., 4), and a five-celled, egg-shaped ovary (Fig. LXXXIII., 6 and 7). After pollination, the ovary becomes an erect, many-sided pod. Though so unlike its cousins in its general appearance and its habits, the structure of its flower proclaims it to be a near relation of the heaths, and most closely allied to the familiar pipsissewa. It may be flushed with faint pink, but it is usually pearly white, standing out from a dark setting of decaying, moss-covered wood, so strange and weird as to win the name of "ghost-flower." It is a most disappointing plant to gather, for it blackens after death, and nothing will persuade it to retain its waxy purity. The pine-sap or false beech-drops, *Monotropa hypopitys*, is common from

Cape Breton to Western Ontario, especially among balsams, spruces and birches. Its small, fragrant flowers, which vary from white to tawny or bright red, are grouped in close clusters. Soft hairs radiate from the style, barring the way to the nectary against short-tongued insects, but allowing bees to enter freely. Like the Indian-pipe, it is saprophytic in habit and degenerate in form, an illustration of the possibility of passing downward instead of upward in the process of evolution.

XIV.

THE APPROACH OF AUTUMN.

Although the flowers of early summer have faded beneath the August suns, and golden-rods and asters are lingering on their way, September has its own beauties and many plants, which opened their first flowers in July, still display a wealth of bloom. Clovers are disappearing, but other members of their family are well worth seeking. Throughout eastern Canada, "the



FIG. LXXXIV.—WILD OR HOG PEA-NUT.

ground-nut trails its vine," laden with compound leaves and fragrant clusters of purplish-brown or reddish flowers. The slender stems filled with milky juice spring from edible tuberous underground stems, "the ground-nuts," from which the plant takes its common name. *Apios tuberosa*

bears its true fruit in the usual manner, the flowers being succeeded by leathery, curving pods. But its relative, the wild or hog pea-nut, *Amphicarpea mon- oica*, has underground fruits which resemble pale, rounded peanuts. This graceful vine is often found climbing over asters, goldenrods, and other low plants in moist thickets and by shady roadsides from New Brunswick to Lake Superior. The stems, which are twining, wiry, and covered with brownish hairs, grow from one to eight feet long. The compound leaves are made up of three thin leaflets which are somewhat egg-shaped and pointed (Fig. LXXXIV., 1). Small pale purple or white blossoms spring in dropping clusters from the axils of the leaves. Each blossom has the characteristic form of the pea family but, though butterfly-shaped, the standard is partly folded around the wings, and the keel and wing-petals are almost straight (Fig. LXXXIV., 2). Ten stamens are arranged in two groups, nine in the same brotherhood, while the remaining one stands alone. A single pistil at maturity becomes a hairy pod (Fig. LXXXIV., 3). The showy flowers often fail to set seed, but their work is supplemented by that of solitary, inconspicuous flowers which are destitute of petals. The latter are borne on slender creeping branches which arise from the axils of the lower leaves and produce pods close to the ground or under it. Each pod generally holds one large seed, but it may contain more. Thus, though cross pollination frequently occurs, like most plants bearing cleistogamous flowers, the self-pollinated blossoms are the most fertile.

An interesting flower, especially in its relation to insects, blossoms from July to September. The turtle-head, *Chelone glabra*, is very common in wet meadows, bogs and beside streams, from Newfoundland to Turtle Mountain in Manitoba. Erect, smooth, unbranched stems from one to three feet in height bear numerous opposite, lance-shaped, toothed leaves (Fig. LXXXV., 1). At the top of each stem is a dense cluster of white or pinkish flowers. The calyx is five-toothed and the corolla is irregular and two-lipped. The upper lip is swollen, slightly notched and arched; the lower is three-lobed, spreading, and woolly within. Of the five stamens, one is sterile (Fig. LXXXV., 3), and the remaining four have heart-shaped, woolly anthers and hairy filaments (Fig. LXXXV., 4). As in other members of the figwort family, the single pistil has a two-celled ovary and a slender style (Fig. LXXXV., 5).



FIG. LXXXV.—TURTLE-HEAD.

The flower bears a slight resemblance to a reptile's head, and the name "chelone" is derived from a Greek word meaning tortoise. Even a bumblebee finds it difficult to obtain honey from a very young flower, but later he succeeds in entering. When the insect alights upon the stiff, elastic lower lip, his weight presses down the lip and an opening is made through which the bee forces his way to the nectary. In so doing, his velvety back is abundantly dusted with pollen from the heart-shaped anthers. Flying away to an older flower, he finds an easy entrance. In such blossoms the stamens are empty and the stigma is in the position formerly occupied by the anthers. Therefore, while the bee obtains his sip of honey, the work of cross-pollination is easily accomplished. Smaller insects are prevented from stealing the nectar by the hairs which line the lower part of the throat of the flower; and the sterile stamen may bar the way against tiny intruders.

Also blossoming from July to September, the mad-dog skullcap, *Scutellaria lateriflora*, is found with the turtle-head on the wet borders of streams. Though somewhat unevenly distributed, it occurs in every part of Canada from Newfoundland to the Pacific Ocean. The skullcap has the square stem, opposite leaves, and the two-lipped flower with the four stamens and a four-celled ovary which are characteristic of the mint family. The stem is from nine inches to two feet in height, the leaves are oblong, thin, toothed, and from one to three inches long. Blue or whitish blossoms about one-



FIG. LXXXVI.—MAD-DOG SKULLCAP.

quarter of an inch long arise from the axils of the upper leaves and form one-sided clusters (Fig. LXXXVI., 1). The two-lipped calyx has a helmet-like appendage on the top which enlarges after the corolla falls and meets the lower lip, enclosing and sheltering four tiny nutlets, which are produced by the separation of the four parts of the ovary (Fig. LXXXVI., 3). The lower lip of the corolla is three-lobed and forms a convenient platform upon which insects alight; and the upper lip overarches the young bearded stamens. Two of the stamens have one-celled anthers, but the upper and shorter stamens have two-celled anthers (Fig. LXXXVI., 2). After the pollen has been shed, the stamens wither and the two-cleft style assumes the position formerly occupied by the anthers. Therefore, an insect, beginning his visits at the base of a cluster, pollinates the older blossoms with pollen brought from young flowers at the top of another bunch previously visited. The mad-dog skullcap was supposed by old herbalists to be a cure for hydrophobia, and from this belief arose its folk-name. Another common species, the hardy marsh skullcap, *Scutellaria galericulata*, has the same range and delights in shady, swampy land. Its blossoms, which occur singly in the axils of the upper leaves, are violet-blue, about three-quarters of an inch long and each is supplied with an erect instead of a spreading lower lip.

Although several species of rein-orchis are found in the early summer, the genus seems more characteristic of August and

September. The small, northern bog-orchis, *Habenaria obtusata*, is very common in cool mossy woods throughout the forest region of the Dominion of Canada. A stem from five to nine inches in height, bears a single leaf at the base (Fig. LXXXVII., 1), and



FIG. LXXXVII.—SMALL NORTHERN BOG ORCHIS.

a loose cluster of greenish white flowers at the top (Fig. LXXXVII., 2). The upper sepal is erect and green, with a whitish margin; the lip is entire (Fig. LXXXVII., 3); the spur slender, almost straight, and blunt (Fig. LXXXVII., 4); and the anther sacs are widely divergent (Fig. LXXXVII., 5). The tall, white bog-orchis, *Habenaria dilatata*, is found at the same time and in similar places. Its stem is abundantly supplied with narrow linear leaves; its flowers are white; the spur is incurved; the lip dilated at the base, and the glands of the pollinia are large and close together. *Habenaria bracteata* is often found in grassy woods and meadows, from New Brunswick to British Columbia. Greenish flowers, with white, sac-like spurs arise from the axils of very long bracts. A few species of fringed orchis are occasionally seen, especially in the east. *Habenaria blephariglottis*, the white-fringed orchis, is very charming. Pure white, fragrant flowers with long spurs and deeply fringed lips form long slender spikes. Growing in swamps and peat-bogs, the beauty of the plant is little known. The long-tongued

sphinx moth appreciates its nectar, and as a penalty for his greed has his eyes plastered with the sticky disks of the pollen-masses. The yellow fringed-orchis, *Habenaria ciliaris*, has gorgeous orange-yellow flowers. Its home is near that of the white fringed-orchis; and its yellow flowers with strong fragrance are especially attractive to night-flying visitors, but several butterflies are equally welcome. The purple-fringed orchis, *Habenaria fimbriata*, is one of the handsomest of the genus. The lip is of a deep pink-purple colour, about one-half an inch in length, fan-shaped, three-parted, and deeply fringed. It is a little earlier than the other species, blossoming from June to August, in the rich moist meadows and woods of New Brunswick, Quebec and Ontario.

Though local in its distribution, the great lobelia, *Lobelia syphilitica*, deserves attention. Its bright blue flowers, touched with white and fading to pale blue, are often seen along the St. Lawrence and Great Lakes from Prescott to Owen Sound, and further north in the limestone region. A stout, unbranched, hairy stem arises to a height of from one to three feet, bearing large, irregularly toothed, pointed leaves (Fig. LXXXVIII., 1). The large blossoms, about one inch long, are grouped in a long,

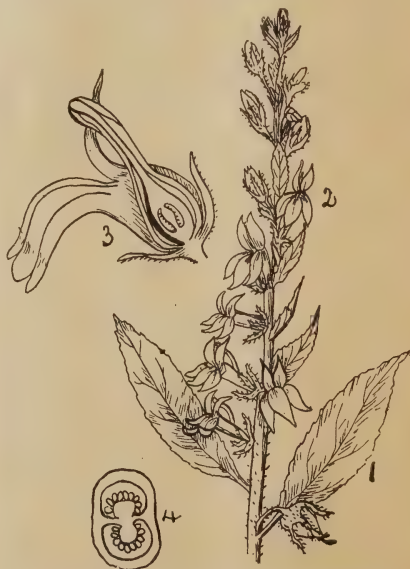


FIG. LXXXVIII.—GREAT LOBELIA.

leafy spike (Fig. LXXXVIII., 2). Each flower has a hairy, five-lobed calyx; a two-lipped corolla, with a long, slender tube split on one side; five stamens united by their hairy anthers about the style (Fig. LXXXVIII., 3), and a two-celled ovary (Fig. LXXXVIII., 4) with a two-cleft stigma. Three of the anthers, which are larger than the other two, may be smooth. The style and the coherent stamens project through the slit in the corolla. In young flowers, the anthers are mature and pollen is shaken from them by visiting bees. But self-pollination is prevented, the immature stigmas enclosed within the anthers, remain pressed together until the elongating style forces them through the ring of anthers; then the lobes of the stigma expand and are ready to receive pollen from another flower. Occasionally, however, some of the pollen clinging to the hairs of the anthers reaches the stigma of the same flower and self-pollination ensues. Indian, or wild tobacco, *Lobelia inflata*, is a much less attractive member of the same genus. Its pale blue or violet flowers are small and scattered in the leafy clusters. Its distinguishing mark is the much inflated, ribbed seed-pod. The plant blossoms from July to November and is quite common from the Atlantic Ocean to the Saskatchewan River. Although it contains a poisonous substance, it was used in making a popular quack medicine, and was smoked by Indians, who enjoyed the drowsiness it induced.

September has its flowering shrubs, one of the prettiest of which is the button-bush, *Cephalanthus occidentalis*. This charming bush, with fragrant, creamy-white globes of flowers, is common along the muddy borders of rivers and lakes in Quebec and Ontario, and has been found in Nova Scotia and New Brunswick. Oval, tapering leaves are produced in small whorls or opposite to one another (Fig. LXXXIX., 1); and from their axils arise long stalks upon which are borne large, round clusters of small, sessile flowers (Fig. LXXXIX., 2). Each blossom has a small, four-lobed calyx, which is united to the ovary, and a four-toothed tubular corolla, hairy within. Four stamens, with anthers which are tipped with sharp points at the base, are attached to the corolla by short filaments. The stamens mature before the stigmas, shedding their pollen even in the bud upon the top of the style. Later the flowers open and the long style protrudes from the corolla tube. Finally when the pollen has been brushed from it, the stigma matures and becomes sticky for the



FIG. LXXXIX.—BUTTON-BUSH OR HONEY-BALLS.

reception of pollen brought from older blossoms. Later, the seed-pods (Fig. LXXXIX., 4), make dull red and green balls, which become exquisitely bronzed after the early frosts.

Equally conspicuous, sending up green or purplish stems from three to ten feet in height, Joe-Pye weed, *Eupatorium purpureum*, fills low meadows and woods throughout Canada with dull purplish bloom from August to September. This stout, perennial herb is clothed with whorls of from three to six leaves, each of which are very veiny, rough, lance-shaped or oval and toothed (Fig. XC., 1). At the top of the stems are large, loose compound clusters of flower-heads. (Fig. XC., 2). The blossoms are dull magenta or pinkish-lavender in hue and slightly fragrant. Each head (Fig. XC., 3), contains from five to fifteen tiny flowers which have the distinguishing characteristics of the composite family. The corolla is not prolonged into a strap, as in the chicory, but is always



FIG. XC.—JOE-PYE-WEED.

tubular; and the calyx terminates in a single row of slender rough bristles (Fig. XC., 4). Much of the conspicuous colour is due to the purplish scales which closely overlap one another at the base of the individual heads. The folk-name of the plant is said to have been given in honour of Joe-Pye, an Indian medicine-man of New England, who used decoctions of the plant in the treatment of typhoid fever.

The whole genus is famous in folk medicine. Some members of it were used in a popular remedy for an old-fashioned disease called "break-bone fever," and dyspepsia and colds were treated by doses of "boneset tea." Though many other folk-medicines have lost their popularity, thoroughwort or boneset, *Eupatorium perfoliatum*, is still used, and a fluid extract is employed in regular medical practice as a tonic. Thoroughwort is associated with Joe-Pye weed from Nova Scotia to the Lake of the Woods. It is easily distinguished by its dull white flowers and opposite, wrinkled leaves which are sessile and united or clasping at their bases (Fig. XCI). Later and rarer, the white snake-root or Indian sanicle, *Eupatorium egeratoides*, blossoms in rich damp woods from New Brunswick to Owen Sound. It differs from the boneset



FIG. XCI.—BONESET OR THOROUGHWORT.

in having bright white blossoms, and oval petioled leaves, rounded at the base and coarsely toothed. Beautiful as they are, these composite flowers are but the beginning of the dim foreshadowings of the coming autumn glories, when the family will reign supreme.

XV.

THE HARVEST OF THE YEAR.

"Along the roadside, like the flowers of gold
That tawny Incas for their gardens wrought,
Heavy with sunshine droops the golden-rod."

Glinting from fence corner and from thicket, carpeting broad fields, illuminating bog and wood, a bewildering number of varieties of solidago gleam with "gold summer sent." Few know the eighty odd American species, but every one can learn to recognize a few of the commonest. Though the clusters of flowerheads vary in form from slender simple wands to large, spreading, branching plumes, the heads and flowers are similar in all the varieties. The genus is one of the largest of the composite family and the flowers have the characteristics of the group. There is, however, a greater differentiation of labour than in the chicory or the thoroughwort. The small heads (Fig. XCII., 1) are composed of two kinds of flowers. The outer or ray flowers (Fig. XCII., 2), with strap-shaped corollas and no stamens, have for their chief function the attraction of insects; the inner or disc flowers (Fig. XCII., 3), which are perfect and have a tubular corolla devote themselves to the production and protection of pollen and seed. In both, the calyx teeth are represented by a pappus composed of bristly hairs which serve as floats for the ripe fruit.



FIG. XCH.—GRAY OR FIELD GOLDEN-ROD.

The commonest golden-rod throughout Canada is the "yellow weed," *Solidago canadensis*. Flourishing in neglected places along fences, and by the roadsides, its large one-sided, spreading flower-clusters, with recurved branches, crown tall hairy stems. The thin, lance-shaped, pointed leaves, with three strongly marked veins are generally rough, and the lower at least are commonly toothed (Fig. XCH., 1). Occurring still more abundantly in the prairie region is the Missouri golden-rod, *Solidago missouriensis*. Its clusters are shorter in proportion to their width than those of the Canada golden-rod, and its lance-shaped, triple-nerved leaves are firmer, thicker, and somewhat rigid. The margins of the leaves are usually entire, but the lower leaves may have a few scattered teeth (Fig. XCH., 2).

The flower-clusters of the gray or field golden-rod, *Solidago nemoralis*, are similar to those described, but are smaller and of a deeper, richer yellow. Stems from one-half to two and a half feet in height are clothed with soft gray hairs, and supplied with hoary, grayish-green, three-ribbed leaves, which are broader at the apex than the base and taper into a petiole (Fig. XCH., 3). This species grows in dry sandy or gravelly soil, and ranges from Anticosti to the Rocky Mountains. The prairie forms are low-growing and usually have entire leaves. *Solidago rigida* is found in similar situations from Ontario to the Rocky Mountains, and is very common in the western prairie region. Its flower-heads are grouped in a broad, dense, flat cluster, and the thick, stiff, oblong or oval leaves are not three-nerved but feather-veined. The upper leaves are sessile and clasping, but the lower taper into long petioles (Fig. XCH., 4). The late golden-rod, *Solidago serotina*, which is said to extend from Newfoundland to British Columbia, resembles the Missouri golden-rod. Its leaves, however, are thinner, sharply-toothed, and smooth with



FIG. XCH.—LEAVES OF GOLDEN-RODS.

the exception of the margin, which is fringed with rough hairs (Fig. XCH., 5).

The bog golden-rod, *Solidago uliginosa*, abounds in sphagnum and tamarack swamps, east of the Rocky Mountains. Its upper leaves are sessile, the lower are large and petioled, and all have a few well-marked veins. A wand-like, densely-flowered spike terminates the stem. A species which is often called the white golden-rod, or the silver-rod, *Solidago bicolor*, is found in old fields, dry thickets, and along river banks from Nova Scotia to the Saskatchewan River. The basal leaves are hairy, broadly oblong, and taper into long petioles. In the axils of the smaller upper leaves grow little clusters of cream-white flowers, forming a narrow rod-like mass which terminates the simple, hairy stem. Another form, which has its flower-heads grouped in little clusters in the axils of the upper leaves, is the broad-leaved golden-rod, *Solidago latifolia*. Its flowers are, however, the typical yellow, it grows in a zig-zag manner, and its leaves are broadly egg-shaped and

very sharply toothed. This species is quite abundant on moist shady banks, in woods, and along the edges of ravines east of Georgian Bay.

Mingled with the yellows of the golden-rods and the crimsons and browns of autumn leaves the rich purples and delicate lavenders of wild asters form charming colour combinations. In all the asters, the heads are much larger, the ray flowers more conspicuous, and the fruits flatter than those of the golden-rods. A great number of species of asters with many varieties have been described, the majority occurring in North America. The best known in the eastern part of the Dominion is the common blue or heart-leaved aster, *Aster cordifolius*. The lower leaves are all heart-shaped, toothed and petioled (Fig. XCIV., 1); and the much branched stems produce large, misty clusters of small heads with

borne on long petioles near the ground (Fig. XCIV., 2). The flower-heads each have sixteen ray-flowers, and the disc turns reddish brown with age. In cool wet woods from Anticosti to British Columbia, *Aster Lindleyanus* is found. The lower leaves are serrate, ovate and somewhat heart-shaped at the base (Fig. XCIV., 3). The upper are pointed at both ends and sessile. Quite large heads form a loose cluster and the ray-flowers are pale violet in colour. One of the handsomest and most conspicuous of the group is the New England aster, *Aster novae-angliae*. Branching clusters of bright purple flower-heads from one to two inches in diameter crown the stout bristly stem. Numerous, entire, lance-shaped leaves clasp the stem with ear-like lobes (Fig. XCIV., 4). The species is one of the finest autumn flowers, abounding on rocky banks, in thickets, old fields, and by roadsides from Quebec to Georgian Bay.

Near at hand but in moist soil and blossoming from July to November, *Aster panicus* sends up tall, stiff, hairy stems with branched clusters of pale violet or lavender flowers. Long, narrow leaves rough on the upper surface and along the lower side of the midrib clasp the purplish stem. (Fig. XCIV., 5). The rays are large and showy, and the plant grows in great luxuriance in low lands and along streams from the Atlantic Ocean to the Rocky Mountains.

Although the finest asters are some shade of purple, many of the most widely distributed are white. *Aster paniculatus*, which blooms from August to October, bears large elongated clusters of flower-heads on smooth stems. The numerous ray flowers are about one-third of an inch long and, though usually white, they are sometimes tipped with violet. The leaves are pointed, narrowly lance-shaped, and sparingly toothed (Fig. XCIV., 6). A common form in some localities in the east is the Michaelmas Daisy or white heath aster, *Aster ericoides*. The low branching stem produces great quantities of small flower-heads, white or tinged with purple until the late frosts have destroyed all plant life.

In many localities, blazing stars add their splendour to that of other autumn composites. According to Macoun, the blue blazing star or large button snakeroot, *Liatris scariosa*, is very common in Ontario, and some parts of the west prairie region especially along the borders of ponds and marshes. Stout, simple, hairy stems, which arise to a height of from two to five feet, bear narrow leaves, all densely punctate; the basal leaves are broader and narrow into a petiole (Fig. XCV., 1). Large, showy

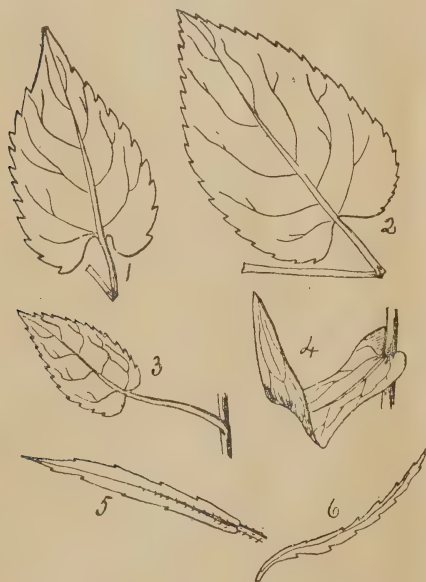


FIG. XCIV.—LEAVES OF ASTER.

pale lavender rays. Associated with this form, especially in Quebec and Ontario, is another species with heart-shaped leaves and pale lavender or whitish flowers. But the broad-leaved aster, *Aster macrophyllus*, is easily recognized by the three or four large, thick, rough, closely-serrate leaves



FIG. XCV.—BLAZING STAR OR LARGE BUTTON SNAKEROOT.

heads (Fig. XCV., 2) of tubular flowers (Fig. XCV., 3) are closely clustered at the top of the stem. Each purple blossom has the distinguishing characteristics of the family, and there is no differentiation into ray and disc flowers. The branches of the style are very long and the pappus is composed of hairy bristles. *Liatris punctata*, the dotted button-snakeroot, is even more common from the Lake of the Woods to the Rocky Mountains. All the leaves are narrow and the heads of flowers, smaller than those of the last species described, are sessile and crowded into a dense spike.

Quite unlike the thistle-like blossoms of the blazing star are those of the graceful lion's foot or white lettuce, *Nabalus serpentarius*. From Newfoundland to Lake Huron this composite displays its clusters of drooping, creamy, bell-shaped flower-heads, during the autumn months. A stout or slender smooth stem bears a number of leaves most variable in outline, but frequently deeply lobed (Fig. XCVI., 1). Each pendulous head (Fig. XCVI., 2) contains from eight to twelve flowers, enclosed in an involucre of coloured bracts, each blossom having a strap-shaped corolla (Fig. XCVI., 3), and light-brown or straw-colored pappus. Rattlesnake-root, *Nabalus albus*, occurs in open grounds and along the borders of woods from Newfoundland to the Saskatchewan. Its leaves resemble those of the lion's foot, but its flower-heads are smaller and more fragrant, and the pappus is a dark cinnamon brown. The last characteristic furnishes an easy means of distinguishing it from the tall white lettuce, *Naba-*



FIG. XCVI.—LION'S-FOOT OR GALL-OF-THE-EARTH.

lus altissimus, which has similar heads but a light straw-coloured pappus. The last species extends from Newfoundland to Manitoba. All three are called by the same folk-names, such as lion's foot, rattlesnake-root, and cankerweed.

Brilliant sunflowers, golden tansies, white everlastings, with lingering daisies and May-weeds assist in making the composite family almost omnipresent during September and October. Nevertheless, many other groups have beautiful and interesting representatives well worth studying. The red pennons of the cardinal-flower hang motionless upon their upright staves, seeking reflection in the streams and meadow brooks from Nova Scotia to Georgian Bay. The brilliant vermilion of the cardinal-flower, *Lobelia cardinalis*, makes it as attractive to humming-birds and bees as the great blue lobelia which blossomed earlier in the year and which still remains beside its gayer sister. Even the orchids do their part. The pretty ladies' tresses, *Spiranthes Romanzoffiana* is not uncommon in bogs and on wet sand from the Atlantic to the Pacific, and *Spiranthes gracilis* is found in open woods and on grassy slopes from Nova Scotia to Manitoba. Both species have white fragrant flowers arranged in slender twisted spikes. The clusters of flowers have

a general resemblance to those of the rattlesnake plantain, but the leaves are narrower and more grass-like, the upper ones being reduced to pointed bracts.

Blue vervain or wild hyssop, *Verbena hastata*, produces its small blue flowers from June to September. A rough four-sided stem from three to seven feet in height bears numerous, opposite, lance-shaped, toothed leaves (Fig. XCVII., 1). The branches terminate in many slender spikes (Fig. XCVII., 2), which usually have small seed-pods at the base, blue flowers in the



FIG. XCVII.—BLUE VERVAIN OR WILD HYSSOP.

middle and buds at the top. Each blossom (Fig. XCVII., 3) has a five-toothed calyx (Fig. XCVII., 4), an irregular five-lobed corolla, two long and two short stamens (Fig. XCVII., 6), and a single pistil differing from that of the mint family in not being deeply four-lobed, although it is four-celled (Fig. XCVII., 5). It belongs to the *Verbena*-family, a group better represented in warmer countries, and is commonly found throughout Canada.

The *Orpine* family contains few genera, but they are of wide distribution, and the sedums are well represented in North America. The common *orpine* or *live-forever*, *Sedum telephium*, has escaped from cultivation in nearly all the old settlements in Canada and has become a troublesome weed by roadsides and along garden fences. It is a perennial plant with thick, fleshy stems, which have enough vitality to grow even when picked and placed in a botanist's press. Thick, ovate, coarsely toothed, grayish-green leaves (Fig. XCVIII., 1) are somewhat thickly set upon the stem, the lower being sometimes stalked. Dense, broad clusters (Fig. XCVIII., 2) of purple flowers ap-



FIG. XCVIII.—ORPINE OR LIVE-FOR-EVER.

pear from June to September. Each blossom has a four or five-lobed calyx, four or five separate petals, eight or ten stamens and a pistil of four or five carpels, separate or united at their bases (Fig. XCVIII., 6). The generic name is from the Latin *sedere*, to sit, in allusion to the manner in which some members of the group attach themselves to rocks and walls.

The closely allied *Saxifrage* family is represented throughout Canada by the charming *grass-of-parnassia*, *Parnassia palustris*. Broad, oval or heart-shaped leaves on long petioles are grouped at the base of the plant (Fig. XCIX., 1), and from their midst arise slender flower-stalks from eight inches to two feet high, with a clasping leaf near the middle of each (Fig. XCIX., 2). A creamy-white flower delicately veined with green and about one inch in breadth, terminates each scape. Five fertile stamens alternate with the petals (Fig. XCIX., 3) and 5) and groups of modified stamens called staminodia (Fig. XCIX., 4) are borne at the bases of the petals. It has been suggested that these curious bodies serve as landing



FIG. XCIX.—MARSH OR NORTHERN GRASS-OF-PARNASSUS.

places for visiting insects, obliging them to climb over to the centre of the flower for nectar, and, in so doing, to receive a dusting with pollen which in a similar way is conveyed to the stigmas of older flowers. A single short pistil with four crowning stigmas occupies the centre of the flower (Fig. XCIX., 6). The grass-of-parnassus is not even closely related to the true grasses, but has its nearest relatives among the mitreworts and saxifrages of the spring, though its delicate blossoms often suggest the anemones and recall the pale flowers of the early year.

XVI.

"WHEN WOODS ARE BARE."

"Withered in the footpaths lie
The fallen leaves, but yesterday
With ruby and with topaz gay."

Though asters and goldenrods are faded and brown, some members of the family are lingering. The large bur-marigold, *Bidens chrysanthemoides* (Fig. 1) still spreads its golden rays beside shallow pools and in swamps and ditches throughout the eastern part of Canada. Annual branching stems from one to two feet in height bear opposite lanceolate leaves, with toothed margins and no petioles. Numerous showy heads, from one to two and a half inches across



FIG. C.—LARGE BUR-MARIGOLD.

stand erect on short stalks. From eight to ten brilliant yellow rays encircle a dull yellowish or brownish disc of tubular flowers. Having lost both stamens and pistils, the ray flowers are called neutral and devote themselves exclusively to attracting bees, butterflies, wasps, flies and beetles to the nectar concealed within the tubular flowers. The latter have both stamens and pistils and produce strong seed. After pollination, the rays fall and the ripened pistils of the disc flowers become a brittle mass of small fruits. Instead of a feathery pappus, each achene has from two to four stiff awns which are covered with backward pointing barbs (Fig. C., 1). By means of these prongs the fruits cling tenaciously to passing animals and men, who thus become unwilling immigration agents. A related species, *Bidens frondosa*, has similar fruits with only two prongs. It has become such a nuisance to wayfarers as to deserve its popular names, beggar-ticks, stick-tight, stick-seed, and beggar-lice. Having none of the attractions of the large bur-marigold, it is one of the least-loved weeds of Canada, flourishing in moist, fertile soil from Nova Scotia to British Columbia. Smooth, erect, branching stems arise to a height of from two to nine feet, and support thin leaves on slender stalks. The lower leaves are divided into three or five segments, but the uppermost may be entire; all are pointed and sharply-toothed. Many dull, dark yellow heads sway on delicate stems. Each is composed of tubular flowers and rays are wanting or inconspicuous.



FIG. CI.—FRINGED GENTIAN.

Much more charming than these tramps are the gentians. Owing to Byrant's poem, the best known is the Fringed Gentian, *Gentiana crinita*. (Fig. CI.) Even those who have never seen its

"Sweet and quiet eye,
Look through its fringes to the sky
Blue—blue—as if that sky let fall
A flower from its cerulean wall."

are constantly looking for this autumn beauty "when woods are bare and birds have flown." Unfortunately, Byrant sacrificed truth to sentiment, and though blossoms have been found in early November, they have disappeared

"When frosts and shortening days portend
The aged year is near his end."

This exquisite plant has been seen in several localities from Quebec to the Swan River in low woods and moist meadows. Branching stems from one to three feet high

are clothed with sessile opposite leaves, heart shaped at the base. Bright blue (rarely white) flowers, two inches in length, stand stiffly erect on the ends of long stalks (Fig. CI., 1). Each blossom has a four-lobed calyx, and a funnel-shaped corolla with four spreading, rounded, fringed lobes. Four stamens are joined to the corolla tube (Fig. CI., 2), and in the centre is one pistil (Fig. CI., 3), with two stigmas and a one-celled ovary filled with scaly, hairy, seeds. Cross-pollination is ensured in an interesting way. The anthers mature before the pistils and shed their pollen on bumblebees who seek the nectar secreted by the tube of the corolla. Then the stamens wither and the pistil elongates, bringing the stigmas into a proper position for the reception of pollen brought from younger flowers. It is probable that bees are attracted to this flower not only by their favourite blue colour but by the

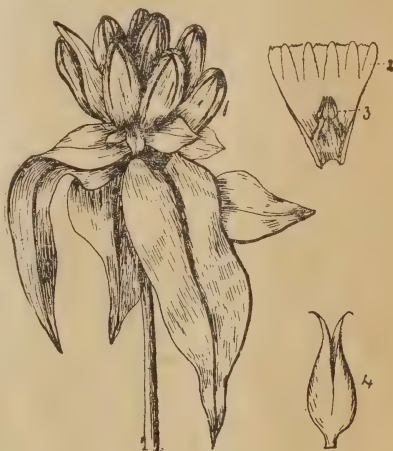


FIG. CII.—CLOSED GENTIAN.

showy fringe which may also serve to keep small crawling insects from the concealed sweets. The fringed gentian opens its petals gaily to the sun but closes them on cloudy days, thus protecting pollen and nectar from showers. The closed gentian, however, is always on the guard and never open the lobes of its corolla.

The Closed or Blind gentian, *Gentiana Andrewsii* (Fig. CII.), occurs in moist soil from Quebec to Port Arthur. Upright smooth stems are furnished with opposite, sessile, lance-shaped leaves. Deep blue flowers form close clusters at the top of the

stem. Each blossom (Fig. CII., 1) has a calyx with recurved divisions, and an oblong corolla with no true lobes, their place being taken by five plaits which overlap one another and close the mouth of the flower (Fig. CII., 2). Unlike those of the fringed gentian, the anthers cohere about the pistil making a short column (Fig. CII., 3). The ripened fruit (Fig. CII., 4) bears conspicuously winged seeds. Like its sister this flower is adapted to cross pollination by bumblebees, while smaller, feebler insects are excluded.

The bumble-bee may find his last feast of honey in the gentians, but another flower probably provides small bees and wasps with a much later supply. When Indian summer has passed and all the woods are bare, the leafless twigs of the witch-hazel, *Hamamelis virginiana* (Fig. CIII.), display delicate clusters of pale yellow flowers in the desolate gray woods of Nova Scotia, Quebec and Ontario. The witch-hazel is a tall, crooked shrub, with simple, straight-veined, wavy-toothed leaves (Fig. CIII., 1). As the leaves fall, clusters of fringed flowers appear upon the sides of the branches (Fig. CIII., 2). The calyx is four-parted (Fig. CIII., 3), with little bracelets at its base. Four long strap-shaped petals are spirally twisted in the bud and curve gracefully as they unfold (Fig. CIII., 4). There are eight short stamens, four perfect (Fig. CIII., 5), four imperfect and scale-like (Fig. CIII., 6). Two pistils are completely united below, but the stigmas are separate. A single bony seed is formed in each carpel, and ripens the following summer. Then the woody seed-vessel bursts and by the pressure the walls exert upon the shining black seeds the latter are hurled far from the parent shrub. Old World superstitions connected with the hazel were in the New World transferred to the witch-hazel. By the help of the one as well as of the other hidden springs of water, concealed treasure, and rich ores were said to have been discovered, and even yet we are told of—

"Something strange and odd
About a certain magic rod,
That, bending down its top divines
Where'er the soil has hidden mines,
Where there are none, it stands erect
Scorning to show the least respect."



FIG. CIII.—WITCH HAZEL.

But a regard for the witch-hazel's powers is now confined to the soothing astringent extracted from the plant, and prosaic is the only magic now exercised.

Though the last flower of the year will soon fade, there will be much to delight a botanist in woodland walks. The delicate and characteristic tracery of naked branches against blue sky, the scattering of fruits and seeds, the protection of growing tips in buds, the habits and forms of evergreens—all afford subjects of study and objects of interest to the nature-lover, who finds no season unlovely or dull.



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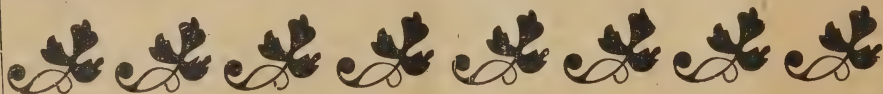
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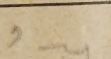
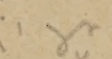

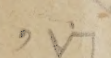
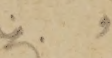
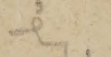
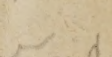






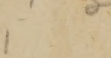


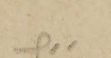
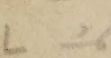
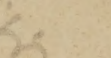


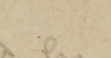

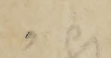
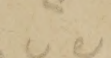


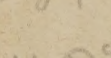
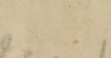
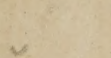
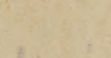

Y.

Yellow-weed 59

MEMORANDA.

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MEMORANDA.

Mrs. W. B. Dana, Say.   
 b(2) Latin or   (genus)
 784 L    
    
   L   
 784 x 15     
   L   

straight Vined

May 1924 Flower 5-5-1, leaves lanceolate,
 small broad leaf, living. stem hairy, etc.



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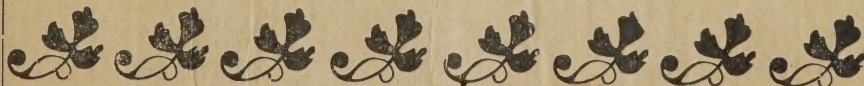


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and how you are getting on

at home

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and happy

as ever

Your affectionate father